The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 128, No. 2 — CHICAGO, ILLINOIS — MAY 12, 1945

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THIOURACIL IN THE TREATMENT OF THYROTOXICOSIS

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There have been several reports [1] of the use of thiouracil in the treatment of thyrotoxicosis since Astwood's [2] important discovery of the value of this drug, but most of these have dealt with only small series of cases. Now, however, we report on the use of this drug in the treatment of 152 patients with hyperthyroidism. The age of the patients varied from 5 to 72 years, and the thyrotoxicosis had existed for from three weeks to twenty-two years. One or more subtotal thyroidectomies had been performed in 17, and 29 had taken iodide until less than a month before thiouracil therapy was begun. In 7 instances iodide therapy had been discontinued because of the development of an associated rash. While most of the patients had diffusely hypertrophied thyroid glands, many had nodular goiters. In 23 cases there were clearcut symptoms of myocardial insufficiency with cardiac dilatation and hypertrophy, and in 5 there was pronounced congestive heart failure. Thirteen had varying degrees of thyrotropic ophthalmopathy or malignant exophthalmos, and 2 had thyrotoxic myopathy. Two patients were treated during the last month of pregnancy and 1 for the first eight months of pregnancy.

Before beginning thiouracil [3] treatment the patient's general condition was evaluated, particular attention being paid to the degree of thyrotoxicity, the condition of the orbital structures and the characteristics of the thyroid gland. Determinations were made of the pulse rate, weight, basal metabolic rate and sometimes the protein bound iodine of the plasma. Most of the first 20 patients were hospitalized and were studied from various points of view. However, few of the patients subsequently treated were hospitalized for more than one day, if at all.

TREATMENT

It is important to choose the optimum dosage of thiouracil, since excessive amounts will increase the incidence of the toxic effects from the drug and may increase the size of the goiter as well as accentuate the manifestations of malignant exophthalmos. On the other hand, it is desirable to use a sufficient quantity to cause a remission within a few weeks. Having used many different dosages, we prefer in most cases to administer 0.5 or 0.6 Gm. daily for the first two weeks, then 0.3 or 0.4 Gm. daily until the basal metabolic rate has become normal, and then 0.1 Gm. twice daily. After two or three months the dosage can be reduced to 0.1 Gm. daily. Since thiouracil is rapidly absorbed from the gastrointestinal tract, rapidly destroyed in the body and rapidly excreted,[4] it would seem desirable to administer the drug at frequent intervals throughout the day. Although we have tried this it has not been possible clinically to demonstrate that it is ever necessary to give more than three doses daily.

Desiccated thyroid has been used to decrease the size of the thyroid gland in 10 patients and to antagonize the effects of thyrotropic ophthalmopathy in 6. It was administered in daily dosages of 32 to 96 mg. for several weeks.

Roentgenotherapy was applied to the thyroid gland in 6 cases. In each case there was diffuse hyperplasia of the thyroid, and a remission of the thyrotoxicity had been induced with thiouracil treatment. To each lobe of the thyroid was applied 200 roentgens at weekly intervals for four to eight weeks in order to decrease the size of the thyroid gland. Thiouracil treatment was continued as usual in all cases.

Subtotal thyroidectomy has been performed in 59 cases. The basis for choosing this treatment rather than prolonged treatment with thiouracil was (*a*) the existence of a very large goiter, (*b*) the development of urticaria or agranulocytosis during therapy, (*c*) factors interfering with careful observations of the patient —business obligations, ignorance, uncooperative attitude, temperamental reactions, psychoneurosis or distant residence—and (*d*) request by the patient for thyroidectomy.

Read before the Section on Experimental Medicine and Therapeutics at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 14, 1945.

From the Thorndike Memorial Laboratory, Second and Fourth Medical Services (Harvard), Boston City Hospital, and the Department of Medicine, Harvard Medical School, and from the Department of Surgery, Boston University School of Medicine and the Massachusetts Memorial Hospitals.

1. Williams, R. H., and Bissell, G. W.: Thiouracil in the Treatment of Thyrotoxicosis, New England J. Med. **229**: 97 (July 15) 1943. Palmer, V.: Hyperthyroidism and Thiouracil: A Preliminary Report, Bull. School Med. Univ. Maryland **28**: 125 (Jan.) 1944. Gabrilove, J. L., and Kert, M. J.: Sensitivity to Thiouracil, J. A. M. A. **124**: 504 (Feb. 19) 1944. Rawson, R. W.; Evans, R. D.; Means, J. H.; Peacock, W. C.; Lerman, J., and Cortell, R. E.: The Action of Thiouracil on the Thyroid Gland in Graves' Disease, J. Clin. Endocrinol. **4**: 1 (Jan.) 1944. Bartels, E. C.: Thiouracil in Severe Hyperthyroidism, J. A. M. A. **125**: 24 (May 6) 1944. Williams, R. H., and Clute, H. M.: Thiouracil in Thyrotoxicosis: Treatment of Seventy-Two Cases, New England J. Med., to be published.

2. Astwood, E. B.: Treatment of Hyperthyroidism with Thiourea and Thiouracil, J. A. M. A. **122**: 78 (May 8) 1943.

3. Thiouracil in this investigation was supplied through the generosity of the Lederle Laboratories, Inc., under the trade name "Deracil."

4. Williams, R. H.; Kay, G. A., and Jandorf, B. J.: Thiouracil: Its Absorption, Distribution and Excretion, J. Clin. Investigation, to be published.

Thiamine was commonly prescribed, as were sedatives. Recently, brewers' yeast has been administered routinely with the hope of protecting against agranulocytosis. Most of the patients were permitted to continue with their regular work; in fact, many never missed a single day of work. They were examined every one

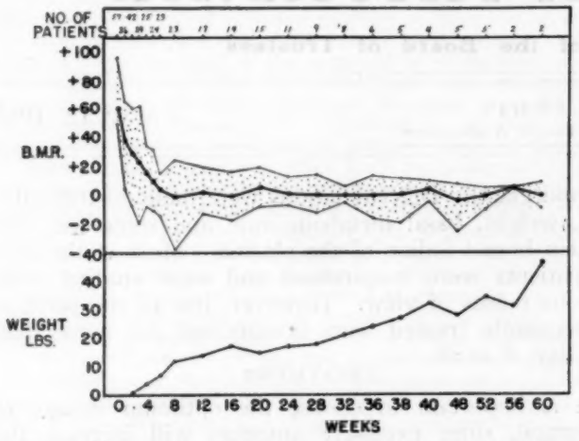

Fig. 1.—The average response to thiouracil treatment of the basal metabolic rate and weight of 57 patients with moderately severe or severe thyrotoxicosis. The shaded area is formed by plotting the highest and lowest values for basal metabolic rate at the time intervals indicated. Note the progressive fall to normal in the basal metabolism, requiring six weeks, and its maintenance at this level. Although there was no average gain in weight in the first two weeks, there was a progressive and well defined gain thereafter.

to two weeks for the first six weeks, at monthly intervals for about the next four months and at six to eight week periods thereafter. All were instructed to consult one of us in the case of fever, symptoms of "the grip," sore throat, or any infection—disturbances suggesting agranulocytosis.

RESULTS OF TREATMENT

Thiouracil Without Thyroidectomy.—Improvement in the thyrotoxicity began within a very few days after commencing thiouracil, and within three to seven weeks there was a disappearance of nervousness, tremulousness, tachycardia, hyperpyrexia, diarrhea and hyperhidrosis. Within the first two weeks there was but little gain in weight, but it occurred rapidly thereafter. Almost all of the patients with malignant exophthalmos experienced an exacerbation in the orbital changes, but patients with nonmalignant exophthalmos exhibited a decided

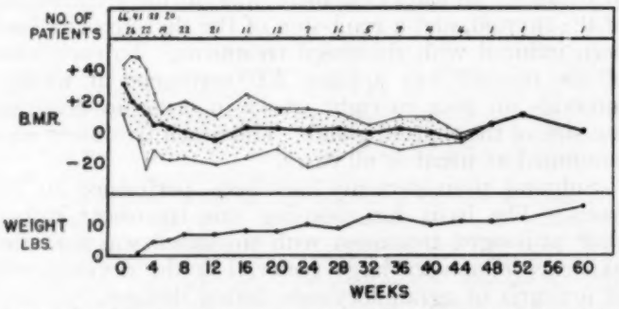

Fig. 2.—The average response to thiouracil treatment of the basal metabolic rate and weight of 66 patients with mild thyrotoxicosis. Except for less magnitude, the changes are the same as in figure 1.

improvement or disappearance of this disturbance. The thyroid gland in most subjects showed little change; in some it became smaller and in a few it became larger and firmer. In most patients the bruit disappeared. The basal metabolic rate became normal within two to seven weeks, the average time being six weeks in the severer cases (fig. 1) and four weeks in the less toxic ones (fig. 2). The protein bound iodine of the plasma became normal [4] sooner than the basal metabolic rate (fig. 3).

With the continuation of thiouracil treatment the clinical remission has been maintained in all cases. Ten patients have been treated continuously for more than a year, 36 for more than eight months and 52 for more than four months. Since the first month or two all have remained essentially free of thyrotoxic symptoms and signs and have maintained a normal basal metabolic rate. In 4 cases with thiouracil continued for approximately a year and in 1 treated for six months the drug was omitted to determine its further need. One subject has maintained a normal status for six months, and 4 have remained normal for two to three months (fig. 4). However, 1 had a relapse after two months. Two other patients have discontinued therapy of their own accord on three separate occasions after they had been in a remission for about three months. Each time a recurrence of thyrotoxicosis appeared in about a month, and it required another month to gain a remission. However, patients treated for only a few weeks experienced a recurrence within two or three weeks.

With the aid of roentgenotherapy in 6 patients or treatment with desiccated thyroid in 10, in almost all of the 152 persons treated with thiouracil for more than four months there has been a reduction in the size of the thyroid. In 23 patients the thyroid gland was two to four times normal in size before treatment, but after prolonged treatment it was only one to one and a half times normal.

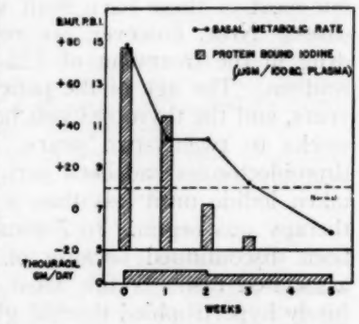

Fig. 3.—Response to thiouracil treatment of the basal metabolic rate and protein bound iodine of the plasma in a patient with severe thyrotoxicosis. In this case, as in others, the iodine was found to return to a normal range (4 to 8 micrograms per hundred cubic centimeters) sooner than the basal metabolism.

Although most patients with malignant exophthalmos experienced an exacerbation soon after taking thiouracil, with the institution of desiccated thyroid each showed improvement, which was pronounced in some cases.

The 29 patients who had had iodide until less than four weeks before beginning treatment with thiouracil improved more slowly than described in the previous paragraphs (compare figure 5 with figures 1 and 2). During the first two or three weeks of thiouracil therapy there was commonly no improvement in patients who had had iodide and, in fact, not infrequently there was an increase in the thyrotoxicity. It has been found that an exacerbation did not occur if the iodide therapy was continued in very small and gradually reduced doses during the first two weeks of thiouracil treatment. Nevertheless the patients previously treated with iodide required an average of about four weeks longer to obtain a remission of their disease than did patients treated with only thiouracil. Occasionally the response was as good as in the cases in which thiouracil was administered and no iodide.

In 5 cases, owing to the development of toxic reactions from thiouracil, iodide therapy was instituted. It seemed to have but little effect in 2 cases, even after several weeks of treatment, but was satisfactory in the other 3.

Thiouracil with Thyroidectomy.—Of the 59 thyroidectomized patients 29 had never had any iodide, 14 had had iodide for varying intervals before thioracil was used, 12 received iodide and thiouracil simultaneously and 4 had had thiouracil replaced with iodide. The last group consisted of patients who developed toxic reactions to thiouracil and were then treated with iodide and thyroidectomy. Their course was essentially as though no thiouracil had been given and needs no further consideration. The preoperative response of the patients who received no iodide until after thiouracil therapy was started was similar to the response obtained in subjects treated with thiouracil alone.

Thyrotoxic manifestations during thyroidectomy were distinctly less severe in the cases treated with thiouracil than in a comparable group treated with iodide. A good state of anesthesia was readily secured with cyclopropane. During the operation the maximal pulse rate of the thiouracil treated patients varied from 79 to 155 and averaged 113 (fig. 6). The maximal systolic blood pressure varied from 65 to 165, while the maximal diastolic pressure varied from 65 to 130, averaging 93. The thyroid gland tended to be more friable and to ooze more than in patients prepared with iodide, and occasionally adhesions extended from the thyroid capsule to surrounding structures.

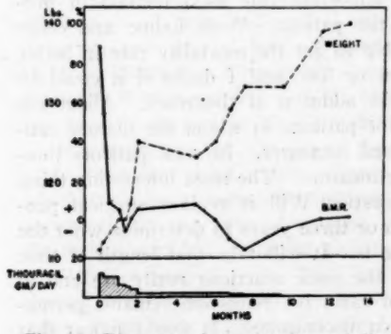

Fig. 4.—Response of the basal metabolic rate and weight of a severely thyrotoxic patient treated with thiouracil continuously for nine and one-half months. A remission has been maintained for three and one-half months after discontinuation of therapy. The plasma protein bound iodine preceding treatment was 12 micrograms per hundred cubic centimeters.

The postoperative course was definitely smoother than in patients treated with iodide. The patients were calmer and had less cardiorespiratory distress. The maximal pulse rate postoperatively varied from 88 to 140, averaging 109. Excepting in 2 cases the pulse never exceeded 125. The average maximum temperature was 100.6 F. and the temperature never exceeded 102 except in 1 case. One patient who had had a smooth course until three hours after operation suddenly experienced respiratory distress and died within five minutes, apparently from embolism.

Preceding thyroidectomy the patients were treated with thiouracil for from eight to two hundred and forty days, averaging forty-two days. It soon became apparent that patients who were treated until the basal metabolic rate became normal, requiring an average of about five weeks, exhibited less reaction to the operation than ones operated on earlier. Since no patients have been found to become refractory to thiouracil and since most of them can continue with their work during the period of preparation for thyroidectomy, it is desirable to take time for satisfactory preparation.

We have recently attempted to reduce the amount of bleeding and friability of the thyroid gland by preparing the patients with iodide and thiouracil. Five patients who had received iodide were also given thiouracil. Seven patients not previously treated with iodide were given thiouracil for five or six weeks, during the last two or three of which iodide also was given. It was found that a remission of the thyrotoxicity could be obtained as readily as though only thiouracil was used, yet there tended to be somewhat less bleeding and friability of the gland. Occasionally the prothrombin time has been slightly increased, but this probably was a rare cause of bleeding.

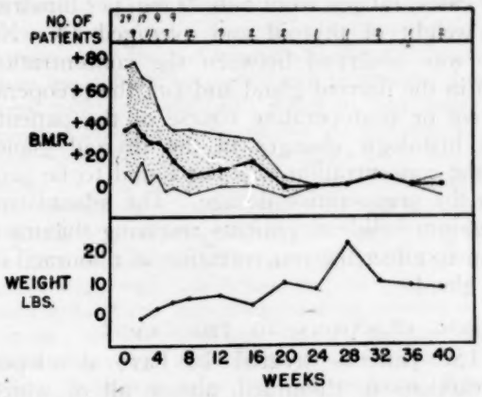

Fig. 5.—Response to thiouracil treatment of the basal metabolic rate and weight of 29 patients who had received iodide therapy for several weeks or more before thiouracil treatment was started. The delayed response in this group can be appreciated on comparing the changes with those in figures 1 and 2.

In the 59 cases treated by thyroidectomy, thiouracil was discontinued within about five days after the operation and most of the patients were permitted to go home two days later. Follow-up studies of all patients have shown that 1 developed myxedema and 2 had a recurrence of thyrotoxicity.

Anatomic and Chemical Changes in the Thyroid Gland.—The thyroid glands of the patients treated with thiouracil differed strikingly from those of patients treated with iodide. The histologic changes in the thiouracil treated glands varied somewhat, but there were rarely involutionary changes. There were usually considerable hyperplasia (fig. 7) of the acinar cells and many papillary projections. The colloid was scant and pale. Many acini contained no colloid, and occasionally none could be found in an entire microscopic section. Aggregations of collapsed acini appeared as solid sheets of cells. There was a slight increase in interstitial tissue. Lymph follicles with active germinal centers were not infrequently seen. The glands of 10 patients had colloid adenomas, and 5 had noncolloid adenomas. There was not much difference in the appearance of the thyroid glands of patients treated for several months and those treated for only three or four weeks. There was no correlation of the operative and postoperative course with the histologic changes in the gland other than that the more the hyperplasia, the greater was the tendency for bleeding.

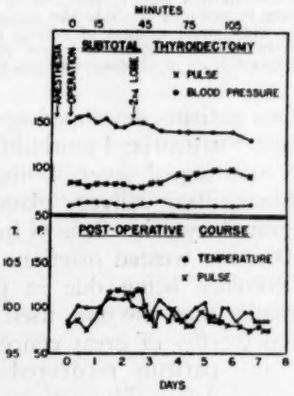

Fig. 6.—Operative and postoperative course of a patient who, as a result of thiouracil therapy, was in a remission from severe thyrotoxicosis. The thyroidectomy was one of the longest and most difficult technically of any of the 59 patients operated on and yet the patient's course was relatively smooth.

When iodide therapy was given before or during thiouracil treatment, usually more colloid and less hyperplasia was observed.

Determinations of the thyroxin content of the thyroid glands of patients treated with thiouracil, without iodide, showed that only small amounts were present. Thus the potentialities for a thyroid storm would appear to be reduced.

The content of thiouracil in the thyroid gland, determined in 37 cases, ranged from 5 to 29 mg. per hundred grams dry weight of thyroid and averaged 14. No relationship was observed between the concentration of thiouracil in the thyroid gland and (*a*) the preoperative, operative or postoperative course of the patients or (*b*) the histologic changes in the thyroid gland. Moreover, the concentration was not found to be proportional to the preoperative dosage. The administration of potassium iodide to patients receiving thiouracil did not seem to affect the concentration of thiouracil in the thyroid gland.

TOXIC REACTIONS TO THIOURACIL

Of the 152 patients treated 16 have developed untoward reactions to thiouracil, almost all of which have appeared during the first five weeks of treatment.

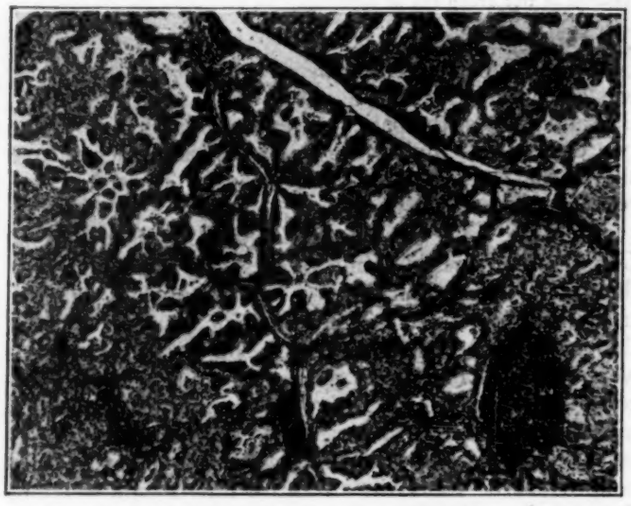

Fig. 7.—Section of a thyroid gland of a thyrotoxic patient who was treated with thiouracil for five weeks. The basal metabolic rate preceding treatment was plus 42 per cent of normal and at the time of thyroidectomy it was plus 4. Note the pronounced hyperplasia of the acinar cells, the very small amount of colloid present and the collapse of the acini. Nests of lymphocytes and one germinal center are present. Slightly reduced from a photomicrograph with a magnification of 80 diameters.

Two patients developed agranulocytosis, 6 edema of the legs, 5 urticaria, 4 morbilliform rash, 2 allergic arthritis, 2 vomiting, 2 fever, 1 diarrhea, 1 enlargement of the submaxillary salivary glands and 1 leukopenia without agranulocytosis. It is of interest to note that of the last 100 cases treated reactions have occurred in only 4, the difference being due in part to the use of dosages smaller than the ones used earlier. The only complication worthy of great concern is agranulocytosis. Both of our patients recovered after being seriously ill for several days. The patients with edema, rash, vomiting, diarrhea and enlarged submaxillary salivary glands were permitted to continue treatment with a reduction in the dosage of thiouracil. The other patients were either operated on soon after the appearance of the complications or were treated with iodide and thyroidectomy.

CONCLUSIONS

Thiouracil has been used in the treatment of 152 patients with thyrotoxicosis. It is highly effective in producing and maintaining a remission of the disease. Patients prepared for thyroidectomy with thiouracil experience less thyrotoxic manifestations before, during and after the operation than do patients prepared with iodide, but their thyroid glands sometimes bleed more. Supplementation of thiouracil with iodide therapy tends to decrease some of the technical difficulties of thyroidectomy. The only serious complication encountered is agranulocytosis, the actual frequency of which remains to be determined.

ABSTRACT OF DISCUSSION

Dr. W. O. Thompson, Chicago: Three developments have occurred in the treatment of toxic goiter within the last few years. One is the demonstration of the interrelation of the pituitary and thyroid, and the dependence of thyroid function on pituitary function. I have recently applied that observation clinically and have been able to cure some cases of exophthalmic goiter by irradiation of the pituitary. Two other lines of attack have come forth. One is the administration of radioactive iodine and the other drugs like thiouracil and thiourea. Radioactive iodine and thiouracil attack the thyroid gland itself, just as surgical measures do. They probably do not attack the fundamental cause of toxic goiter, which many of us believe may reside outside the thyroid gland. Ultimately the method of treating toxic goiter may be an attack on its cause. That is why we were interested in the attack on the pituitary. Thiouracil does not have an important role as a method of preoperative preparation of the patient. With iodine and other measures we have been able to get the mortality rate in better clinics down to 1 per cent or less, and I doubt if it could be made much lower with the addition of thiouracil. About the only preoperative use is for patients in whom the disease cannot be controlled with usual measures. In such patients thiouracil may be a life-saving measure. The most interesting thing about thiouracil is the question Will it replace surgical procedures? It will take two or three years to determine what the precise status of this drug is. It will take that length of time to determine how serious the toxic reactions really are and in how large a percentage of cases the remission remains permanent after the drug has been discontinued. It would appear that a new day is dawning in the treatment of toxic goiter and that the days of the surgeon appear to be numbered. It may be that we shall not treat toxic goiter indefinitely with thiouracil or with these other measures that I have outlined, but we are on the way, and I am happy to see that the disease shows signs of being placed where it really should be placed, namely with the internists.

Dr. Elmer C. Bartels, Boston: The average person with hyperthyroidism responds well to iodine treatment, and operation can be done with little risk. There remains the severely toxic patient who even after ten to fourteen days of iodine treatment is a serious surgical risk. For these patients thiouracil is a most helpful drug. Studies at the Lahey Clinic have shown that thiouracil will reduce the basal metabolic rate to normal levels. Those patients who have had iodine before the administration of thiouracil have had a prolonged course. However, if treatment with thiouracil is continued, a normal basal metabolic rate will be reached. The dose of thiouracil used was 0.6 Gm. a day. The thyroid gland in the 25 patients observed did not decrease in size. The bruit and thrill persisted, and the gland remained in a hyperplastic state. The length of time required to obtain complete control of symptoms seems to be in direct relation to the elevation of the basal metabolic rate. In other words, it takes about one day for each degree of elevation in the basal metabolic rate. If thiouracil is used as a preoperative measure, it is essential that the drug be continued until a normal basal rate is obtained before operation is performed, since a reaction under treatment with thiouracil at a basal rate of + 40 is identical to that under treatment with iodine at a similar basal rate. However, if a normal basal metabolic rate is obtained, a normal anesthesia and postoperative course will follow. All our patients underwent subtotal thyroidectomy without the slightest anesthesia or postoperative reaction. The technical difficulty which the surgeon encounters

in removing the thyroid glands of patients who have received thiouracil is extremely great. On opening the skin, excessive bleeding occurs and the gland is found to be extremely soft and friable. It is difficult to isolate the recurrent laryngeal nerves and the parathyroid glands which our surgeons wish to see. We have been able to overcome this difficulty by giving iodine to the patients after the thiouracil has produced a nearly normal basal rate. Iodine involutes the gland so that three weeks after its administration subtotal thyroidectomy can be done without difficulty. Our pathologist, Dr. Shields Warren, has shown that the thyroid glands of patients treated with thiouracil are involuted with iodine treatment. We have had only two toxic reactions, which were manifested by fever. Since thiouracil produces hyperplasia, as does primary hyperthyroidism, the possibility of obtaining a cure from this agent seems to be unlikely. It was for this reason that we took a conservative attitude toward thiouracil, using it only as a preoperative measure. I should like to have Dr. Williams give his opinion as to this matter, since I fear the idea is developing that thiouracil has unquestionably curative properties.

DR. KARL E. PASCHKIS, Philadelphia: My experience in a series of about 30 cases is about the same as that of Dr. Williams; that, after effective and prolonged treatment, one can produce a clinical cure. Whether or not the drug will be a real cure is premature to tell. I agree with Dr. Thompson that it will take several years to solve that problem. The question whether the drug has any definite indication, aside from our curiosity to gain more experience, I would answer in the affirmative. I have had several cases in which I felt that this drug was needed and I would have been at a loss as to what to do without it. One group comprised cases in which the surgeons themselves felt that for one reason or another it was not safe to operate at all. Another group of cases in which there is a definite use consists of those which have been treated for a long time with iodine. Every one of us has seen cases which have been treated for months or for a year with iodine, apparently at one time or another with good response. Then the practitioner has continued giving them iodine, and they have come to the hospital with a high basal metabolic rate, with full-fledged thyrotoxicosis and utterly irresponsive to further iodine. These cases have responded slowly but safely to thiouracil, and we were then able to subject them to surgery or to continue medical treatment. In such cases I believe that there is already today a definite place. I have observed toxic reactions in 4 out of 30 cases. There was no serious toxic reaction. There was no agranulocytosis. The reactions consisted of fever, drug rash, swelling of the joints and, in 1 case, a transient jaundice. All of these, including the jaundice, disappeared twenty-four hours after treatment was discontinued. At least 3 out of the 4 were in some way sensitized, so that with renewed attempts to treat them they reacted with toxic manifestations to minimal doses. It was necessary to discontinue treatment. One of the problems is to find a way of desensitizing such patients. The other problem is of a chemical nature, whether a similar compound might be found which is less toxic. I am rather skeptical, because these toxic reactions apparently are a question of drug sensitivity, and in any active drug we shall always find cases which are sensitive.

DR. RULON W. RAWSON, Boston: At the Massachusetts General Hospital we have used thiouracil primarily to prepare thyrotoxic patients for thyroidectomy. Like Drs. Williams and Clute, we have observed the drug to be an effective agent in causing a fall in the basal metabolic rates and clinical improvement of thyrotoxic patients who have previously had no iodine. Previously iodine treated patients responded to the drug, but at a much lower rate. Likewise patients with toxic nodular goiters respond slowly. We think that this is due to the nature of the drug's action. By determining the ability of thiouracilized thyroids to collect radioactive iodine, we have demonstrated that the drug acts by blocking the iodination of the thyroid hormone. Ergo no fall in the rate of metabolism is evident until the stored hormone has been used. We feel that the advantages of thiouracil over iodine in preparing thyrotoxic patients for thyroidectomy are (1) that if the drug is administered long enough the rate of metabolism can be lowered to normal or lower, thus giving the surgeon a nontoxic goiter to ablate and (2) that the postoperative course of patients prepared for thyroidectomy with thiouracil is much milder than that observed in comparable patients prepared with iodine. In 10 per cent of our cases the vascularity of the gland has proved to be a surgical hazard. Patients prepared with thiouracil and then treated with added potassium iodide have been observed to have less vascular and less hyperplastic thyroids, which as such have been less difficult for the surgeon to remove. I am in disagreement with Dr. Williams's statement that these glands become smaller. We have observed that the thyroids of patients treated with thiouracil become softer. As such they might give an erroneous impression of being smaller. Indeed by determining the thyroid mean cell height of biopsy specimens taken from thyroids of 5 patients before administering thiouracil with similar examinations of the operatively removed thyroids after preparation with this agent, we have demonstrated that the exhibition of this drug does cause an increase in thyroid hyperplasia. We have been concerned by the number of toxic reactions observed in patients receiving thiouracil. We have seen toxic reactions in 15 per cent of our cases. Some of the toxic effects that we have observed have been diffuse lymphadenopathy, morbilliform rash, drug fever and leukopenia. We have not observed agranulocytosis. A few of the cases of agranulocytosis observed by other groups have been fatal. A number of our patients have had dental abscesses develop or become activated while taking the drug. It is my impression that this drug is more effective than iodine in preparing thyrotoxic patients for thyroidectomy. I do not believe that the evidence is adequate to conclude that thiouracil is a medical cure for thyrotoxicosis. A medical cure for thyrotoxicosis will, I think, have to attack the primary pathologic physiology of the disease. I do not believe that thiouracil does that any more than surgical removal of the thyroid does. However, studies of the disease made possible with this new agent have thrown considerable light on the normal and abnormal physiology of the thyroid and may thus contribute to the discovery of a physiologic cure of this malady.

DR. ROBERT H. WILLIAMS, Boston: In the use of this drug, as with thyroidectomy, we are not getting at the basic difficulty of thyrotoxicosis. I agree with Dr. Bartels that it is important to take time in getting the patient well prepared for thyroidectomy. Thus far we have no evidence of "thiouracil escape" or thiouracil resistance. In fact, a large proportion of our patients were permitted to perform their regular activities of life, and therefore the prolongation of treatment did not cause a handicap. Dr. Bartels asked that I express an opinion in regard to the possibility of medical cure, using thiouracil. I do not feel as though we have enough scientific evidence really to venture a guess in that regard. In reply to Dr. Rawson's comment about the discrepancy of his results and ours, concerning a decrease in the size of the thyroid gland, the statement which I made dealt with patients who were treated for more than four months with thiouracil and, if I recall correctly, most of his cases have been treated for less than this period of time.

Vicarious Expression in the Neuroses.—Every neurosis is more or less of a flight from reality. Whenever the stress of life is too strong one may find refuge in fantasy. The conflict between the inner emotions and the crushing realities of life often finds vicarious expression in the neuroses. The process is unconscious and, therefore, is not amenable to reason or logic. One cannot convince or be convinced. The emotions involved are too primitive. One may rationalize one's behavior, one may give reasons which seem to explain, but, in reality, they do not touch the root of the problem. But the neurosis serves a useful purpose. It acts as a safety valve for the emotions. True, it is an infantile way out of a difficulty, but it is none the less an attempt at an adjustment to reality.—Wechsler, I. S.: The Neurologist's Point of View, New York, L. B. Fischer, 1945.

THE MANAGEMENT OF EXTENSIVE SCALP DEFECTS IN CRANIO-CEREBRAL INJURIES

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MAJOR C. E. DOWMAN
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Craniocerebral injuries present themselves, at times, as both a neurosurgical and a plastic problem the solution of which should be accomplished at the initial operation. Intracranial injuries not infrequently are accompanied by partial evulsion and devitalization of the scalp. Probably more scalp tissue is excised during the débridement than is lost by evulsion; however, despite the notorious viability powers of the scalp one can compromise but little when dealing with partially or completely devitalized scalp tissue. The size of the resultant scalp defect ceases to influence the thorough débridement when rather simple plastic procedures are available.

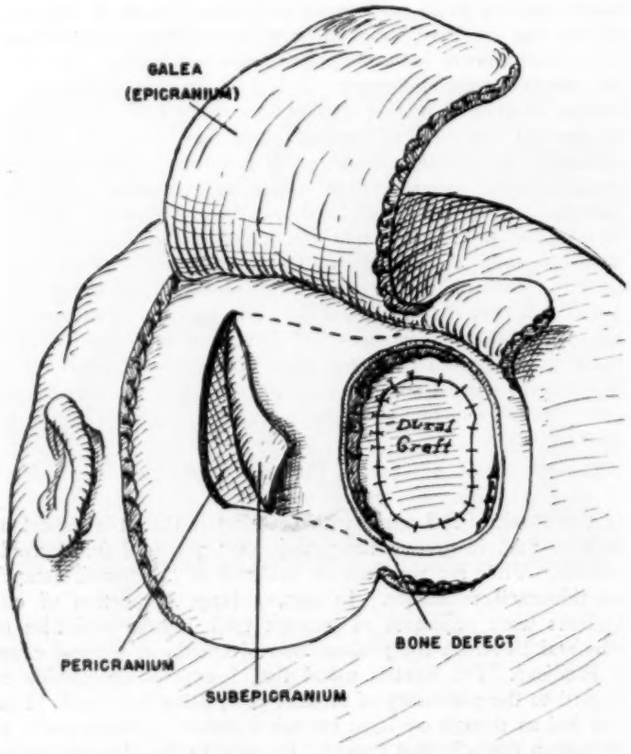

Fig. 1 (case 3).—Elevation of scalp flap. Subepicranial hinge flap outlined and being raised. Dural graft has been sutured into position.

The inelastic character of the scalp is due to the short fibrous septums, which form an inelastic subcutaneous layer and which bind the skin firmly to the galea. However, beneath the galea, the subepicranial space is filled with loose connective tissue. Any form of relaxing incision in the scalp which reaches only as deep as the galeal layer can be of no use, yet even those which penetrate into the subepicranial space allow at best only slight mobility of the surrounding scalp. This is especially true over the occipital and parietal regions; however, over the frontal and temporal areas the scalp is less firmly attached, and small defects may be closed by direct approximation of the skin edges, utilizing relaxing incisions, tripod and the like. Further, owing to the pull of the occipitofrontalis muscle, defects closed in an anteroposterior direction can be brought together with less tension than similar ones closed in the opposite plane.

However, extensive scalp defects are best repaired by sliding flaps obtained from the borders of the defect; nothing can be gained by undercutting and stretching the scalp. Usually one single pedicle flap of sufficient size can be obtained to cover the defect adequately. Occasionally it may be necessary to rotate two single pedicle flaps when availability of scalp tissue is limited. If, for any reason, the blood supply to the scalp is questionable or it is not feasible to make the base of the flap of sufficient width, in order not to jeopardize the result a double pedicle flap should be utilized. Often the scalp lacerations will extend beyond the borders of the defect, and these will in no small way influence the size, shape and number of flaps to be used.

The covering flap, or flaps, should be so designed as to fill the defect without tension and should extend beyond the borders of the bony defect for a considerable distance. The flap can be outlined and quickly raised by blunt dissecting through the subepicranial space with little bleeding encountered in this space. The bleeders above the galea are caught as usual, but those on the flaps are not coagulated nor are ties applied. There is little tendency for the flap to bleed once it has been raised.

At this point, with the scalp flap raised, subepicranial tissue becomes available lateral to the bony defect. A sufficiently large flap of this tissue may be outlined with the base at the margin of the defect and tipped over to cover it (fig. 1).

The scalp flap is now sutured into the defect, covering the subepicranial graft, a two layer closure being used. The drain necessary to prevent the collection of blood or cerebrospinal fluid beneath the flap is placed preferably through a stab wound at some distance from the suture line.

The puckering of the inelastic scalp which occurs at the point of rotation of the flap is unavoidable and in time "irons" out quite well.

The donor site of the flap with its large surface of subepicranium exposed is now covered with a split skin graft carefully sutured into position, the suture ends being left long and to be used as ties later. Accurately fitted over this free graft are several thicknesses of petrolatum gauze and layers of dry gauze, which extend considerably above the surface of the scalp. The long suture ends are now tied over the gauze with moderate tension (fig. 2). This produces, to all intents and purposes, a stent with sufficient pressure over the graft (fig. 3). No additional pressure dressing is necessary. As a result, the dressings which cover the flap and drain can be removed daily if necessary without disturbing the graft. All sutures and the stent are removed on the fifth or sixth postoperative day. At first removal the area covered by the split graft appears as a deep hole, but with contracture of the skin this will gradually fill up (fig. 4).

REPORT OF CASES

CASE 1.—*History.*—The wound, received before 1 p. m. on Nov. 29, 1943, was caused by a high explosive artillery shell fragment, which avulsed the right frontal scalp and drove bone fragments into the right frontal lobe (fig. 5 *A*). The patient was seen at the collecting station at 1 o'clock, where his wound was dusted with sulfanilamide and dressed and a unit of plasma injected. He reached the clearing station at 2:40, the evacuation hospital at 3 o'clock.

Examination.—On admission to this evacuation hospital he was comatose, the pulse rate was 140, the blood pressure was 100/78, he was in moderate shock and bleeding moderately from his wound. He was quite incooperative, but gross neurologic testing revealed no other abnormalities. Five hundred cc. of plasma slowed the pulse to 100, the blood pressure was 120/74, and 500 cc. of blood improved him so that he could be x-rayed and operated on. X-ray examination showed a large defect in the right frontal bone with fractures involving most of the skull, and bone fragments driven into the frontal lobe.

Operations (C. E. D.).—From 11 p. m. of the 29th till 2 a. m. of the 30th under pentothal sodium and local anesthesia the scalp was debrided narrowly, the loose bone fragments were removed, and the remaining bone edges were smoothed. Several radiating fracture lines were noted. About 75 Gm. of damaged brain plus indriven bone and hair was sucked away and the clean bed was checked for complete hemostasis. The only tissues available for closure were the temporal muscle, the pericranium and some subepicranium. These structures were approximated, with the intent of doing a plastic closure later (fig. 5 *B*). Sulfanilamide crystals and petrolatum gauze dressing were applied. By the next morning the closure had broken down with cerebrospinal fluid leakage. The patient was still confused, and movements of the left arm were definitely weaker.

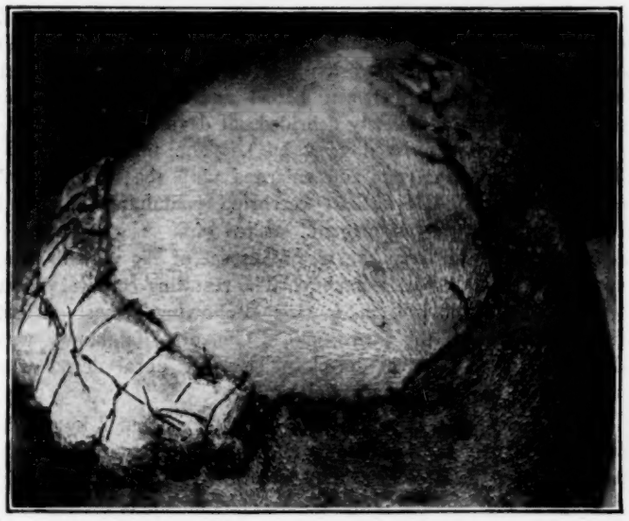

Fig. 2 (case 3).—Six days after operation, showing scalp flap healed and stent over skin graft maintaining pressure tied over by sutures.

Twenty-four hours later, between 1 and 2:30 a. m. of December 1, as it was felt that covering of the exposed brain was necessary, a local anesthetic was given and a large double pedicle scalp flap was outlined posterior to the defect. It was undercut and raised but could not be slid forward sufficiently to reach the anterior edge of the wound (fig. 5 *C*). In view of the scalp laceration, which extended posteriorly from the defect and traversed approximately one third of the way across this flap, it was felt that the use of two single pedicle flaps would be more advisable, utilizing this laceration (fig. 5 *D*). These two flaps were raised by dissecting through the subepicranial space and rotated forward. They were sutured into position in two layers, and the drain was placed through a stab wound anterior to the defect (fig. 5 *E*). The exposed donor site of the flap was covered with a split skin graft, pressure for the graft being obtained by tying the long suture ends over a petrolatum and dry gauze stent.

Postoperative Course.—By December 6 all sutures were removed, the flaps had healed well and the skin graft had taken. However, the patient was still confused and incontinent, the postoperative course being rather stormy. He went downhill rapidly and died December 11. The cause of death was a purulent meningitis.

Fig. 3 (case 3).—Stent after removal.

CASE 2.—*History.*—On Dec. 8, 1943 at 4 p. m. high explosive artillery shell fragments inflicted a large lacerated wound over the bridge of the nose, extending upward with an avulsion of the skin over the left side of the forehead (fig. 6 *A*). The patient reached the aid station at 4:15, where he was dressed and given a half-grain (0.032 Gm.) dose of morphine; he passed through the collecting station at 5:10 and the clearing station at 6:45, where he was given 2 units of plasma.

Examination.—On admission to the evacuation hospital at 8:45 he was mentally confused. A small amount of damaged brain oozed from the wound. There were no gross neurologic signs. His blood pressure was 104/70, pulse rate 64. He was quite cold from exposure and was given 500 cc. of blood and 500 cc. of plasma preoperatively. X-ray examination showed a compound comminuted fracture of the left supraorbital area with bony fragments displaced back and to the right; there were several foreign bodies of the left frontal and orbital areas.

Fig. 4 (case 3).—Entire defect covered six days after operation.

Operation (C. E. D.).—This was performed under pentothal and local anesthesia between 3 and 6:15 a. m. December 9. The patient was given 1½ grains (0.1 Gm.) of phenobarbital

at 9:30 p. m. and ⅙ grain (0.01 Gm.) of morphine and 1/150 grain (0.0004 Gm.) of atropine at 2 a. m. December 9. The skin and galea were radically debrided, and the loose bone fragments of the orbital rim and the roof and mucosa of the frontal sinus were removed. The loose left nasal bone was left in situ. The nasal mucosa exposed on removal of the mesial bone chips was unruptured and was not disturbed. The first branch of the trigeminal nerve lay in the wound and was injected with procaine hydrochloride. A small dural tear over the convexity of the frontal pole was enlarged, and about 10 Gm. of damaged brain was sucked out, bleeding being controlled by the electrocautery. The dura was closed with interrupted 000 silk sutures. Five Gm. of sulfanilamide powder was now sprinkled into the wound and a half-inch petrolatum gauze pack laid into the space between the dura and the remaining frontal bone, being led out through a lateral stab wound.

Operation (S. G. B.).—A large scalp flap, 8 by 8 cm., was raised posterior to the defect, with its base on the right side (fig. 6*B*). The flap was rotated forward into the frontal defect and sutured in two layers. A drain was placed through a stab wound lateral to the suture line (fig. 6*C*). The

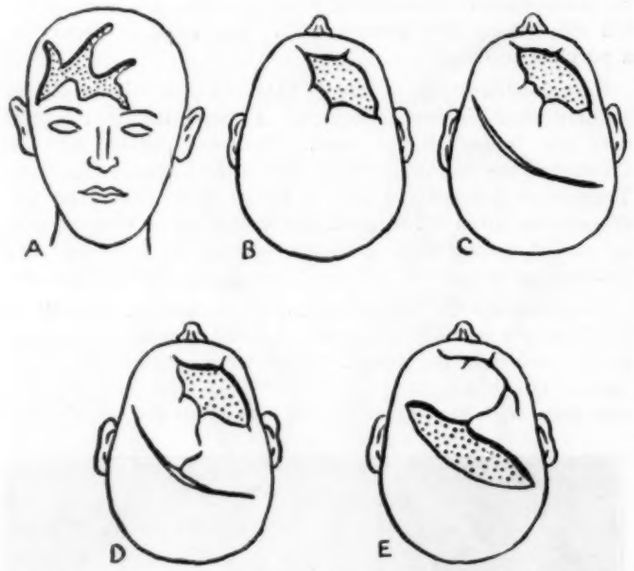

Fig. 5 (case 1).—*A*, outline of scalp defect before débridement. On this as on all subsequent figures, with the exception of figure 1, the outline of the bony defect is omitted for purposes of simplification. However, it extended beyond the borders of the undebrided scalp wounds in all 3 cases. *B*, scalp defect debrided, and partial closure of defect. *C*, double pedicle flap outlined and raised. *D*, two single pedicle flaps outlined, long posterior laceration being utilized. *E*, rotation of flaps forward. Flap donor site ready for split skin graft.

donor site of a flap was covered with a split skin graft in the manner as described previously.

Postoperative Course.—The drain was removed December 10 and all sutures were removed by the sixth postoperative day. The patient made an uneventful recovery and was evacuated to the rear in excellent condition.

Case 3.—*History.*—A gutter wound involving the scalp and underlying bone in the left anterior superior parietal area was inflicted by a high explosive shell fragment, 2 p. m., April 19, 1944. Brain was herniating through the defect and was bleeding freely. The wound was dusted with sulfanilamide powder and dressed at the aid station at 4:25 p. m. The patient passed the clearing station at 5:30 and arrived in fairly good condition at this evacuation hospital at 7:30, almost six hours after the injury.

Examination.—The patient was aphasic but tried to cooperate. The blood pressure was 118/44, pulse rate 76, respiratory rate 20. He had a complete right flaccid hemiplegia, absent superficial reflexes, normal deep reflexes on the left and diminished deep reflexes on the right side. Plantar response was normal on the left, suggestive extensor on the right. The patient's head wound was located just left of the midline in the anterior superior parietal region. The scalp defect was about 8 by 10 cm. in size, covered by a bluish torn and partially devitalized scalp flap. Devitalized bleeding brain herniated through the underlying bone defect measuring about 6 by 6 cm. X-ray

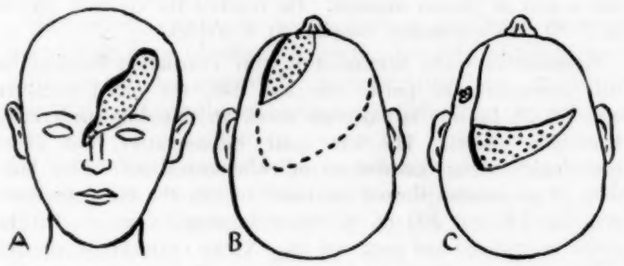

Fig. 6 (case 2).—*A*, debrided scalp defect. *B*, single pedicle flap outlined. *C*, pedicle flap rotated forward with drain through stab wound. Flap donor site ready for split skin graft.

examination showed a gutter type of cranial defect measuring 6 by 12 cm. in the frontoparietal region just left of the sagittal suture line.

Operation (W. W. K.).—Preoperative medication consisted of ⅙ grain of morphine and 1/150 grain of atropine at 12:30 a. m. April 20. The operation was performed with pentothal and local anesthesia between 12:50 and 4:50 a. m. The scalp wound was completely debrided, all devitalized or "doubtful" scalp being removed (fig. 7*A*). The underlying bone defect was smoothed out and enlarged until the frayed dural edges presented. Devitalized cerebrum containing hair and bone fragments was washed and sucked out. A good number of severe bleeders from the medial aspect of the wound were controlled with the electrocautery. The resulting cerebral defect was about 6 by 6 by 4 cm. in size. Following hemostasis and repeated lavage of the entire field, 2 Gm. of sulfanilamide was dusted into the cerebral defect. The large dural defect was closed with a free subepicranial graft.

Operation (S. G. B.).—A large scalp flap, about 7 by 9 cm., was raised over the left temporoparietal region, with the base anterior (fig. 7*B*). The bony defect was then covered by raising a flap of the exposed subepicranium bordering the bony defect, hinged over this and sutured into position (fig. 1). The scalp flap was now rotated over the smaller sealing flap and sutured into position in two layers (fig. 7*C*). A drain

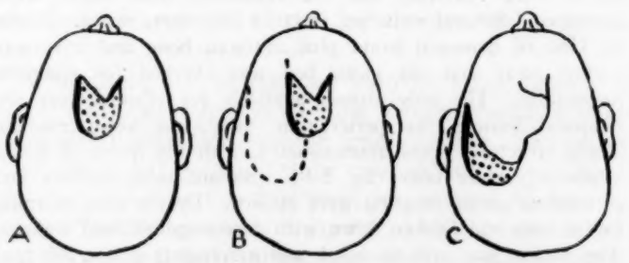

Fig. 7 (case 3).—*A*, debrided scalp defect. *B*, single pedicle flap outlined. *C*, scalp flap rotated medially and donor defect ready for covering with split graft.

was placed in this instance through the suture line. The large defect caused by raising the flap was covered by a split skin graft in the manner described.

Postoperative Course.—The drain was removed within forty-eight hours, and all sutures were removed on the sixth postoperative day. The flap had healed well and the skin had taken (figs. 2, 3 and 4). The patient made an uneventful recovery and was evacuated to the rear in good condition, though still hemiplegic and just starting to regain his speech.

COMPLICATIONS IN THE SURGICAL TREATMENT OF CARCINOMA OF THE LARGE BOWEL

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AND
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In 712 operations for colonic cancer we have found such operative complications as atelectasis, pneumonia, parotitis, coronary occlusion, pulmonary thrombosis and phlebitis infrequent, or at least not relatively increased. Using spinal anesthesia with associated infusion or transfusion and oxygen inhalation, shock has been rare and in no case of such intensity as to prevent the completion of the operation. No serious anesthetic or diabetic complication has occurred. In the postoperative period one elderly man twice developed precordial oppression when 180 cc. of 5 per cent glucose solution had been given; the second time permanent cardiac arrest occurred suddenly when 220 cc. had been given.

TABLE 1.—*Relation of Age to Location of Tumor in 480 Consecutive Cases of Cancer of the Large Bowel*

	Anus and Rectum	Rectosigmoid	Sigmoid	Splenic Flexure	Descending Colon	Transverse Colon	Hepatic Flexure	Cecum	Total	Per Cent
Under 20 years...	0	0	0	0	0	0	0	0	0	0
21 to 30.....	7	0	2	0	0	0	0	0	9	1.9
31 to 40.....	22	4	4	1	0	0	2	3	36	7.5
41 to 50.....	50	25	24	5	4	2	3	6	119	24.8
51 to 60.....	54	40	34	9	1	10	2	7	157	32.7
61 to 70.....	34	32	27	5	3	4	3	10	118	24.6
71 to 80.....	11	12	11	0	1	1	1	2	39	8.1
85 and over.....	1	0	0	0	0	1	0	0	2	0.4
Total.....	179	113	102	20	9	18	11	28	480	
Per cent.....	37.3	25.5	21.3	4.1	1.9	3.7	2.3	5.9		

OPERATIONS

In our series the operations used have undergone considerable evolution. Patients with such advanced peritoneal involvement that resection is out of the question are closed with layer sutures of alloy steel wire and encouraged to be out of bed two or three days after the operation and to return home within a week. For other patients with advanced ineradicable cancer palliative permanent colostomy has largely been replaced by a palliative one stage resection of the diseased segment of bowel and restoration of intestinal continuity, either by end to end anastomosis or a pull through type of operation using a perineal outlet, if possible with utilization of the anal sphincters. This has pleased the patient and his family and has reduced our hospital morbidity and mortality, although it has increased the total mortality of our primary resections. Formerly the patient with advanced local and metastatic growths had a "palliative" colostomy and then was considered such a burden by his relatives that often they refused to remove him from the hospital, where he remained until he died. Now most patients, even with very advanced growths in the liver, are treated by means of resection and are able to leave the hospital within two weeks. As a rule they look and feel much improved after the resection, are able to care for themselves and may be able to do considerable work. From observing these patients it is apparent that the majority suffer more from the toxic necrosis, ulceration and hemorrhage in the bowel than from the metastases in the liver. Even after a previous palliative colostomy, decided improvement may follow the radical operation. A woman, left with a colostomy after two futile attempts at excision of the rectum, was active for three years after removal of the rectosigmoid and transfer of the colostomy to the perineum. If the carcinoma has been of the obstructive type the obstruction rarely returns in complete form at the point of anastomosis during the lifetime of the patient. Duration of life with secondary carcinoma of the liver is variable but not infrequently may continue two or three years, throughout most of which time the patient may consider himself in good or fair health.

TABLE 2.—*Results in 150 Consecutive Operations for Carcinoma of the Colon* *

Operability 96%	Cases	Deaths	Total Mortality, %	Corrected Mortality, %
Exploratory.....	6	0	0	0
End to end single clamp aseptic resection	61	7	11.4	3.3
Abdominoperineal proctosigmoidectomy	55	5	9.09	5.4
Perineal proctosigmoidectomy.....	21	3	14.3	0
Mikulicz-Paul stage resections.....	7	1	14.3	0
Palliative or permanent colostomy.....	0	0	0	0
Total.....	150	16	11.0	6.9

* Corrected by elimination of deaths following radical operation for advanced and ineradicable carcinoma.

WOUND COMPLICATIONS

Abdominal wound infection and dehiscence are especially to be feared after operations for cancer of the colon. We have found oblique muscle-splitting incisions of great advantage. They may be used for carcinoma of any part of the large bowel. For the sigmoid and rectum the incision is placed about 3 cm. above and parallel to the left inguinal ligament. The external oblique is split, and the internal oblique and transversalis muscles are partly divided. If more room

TABLE 3.—*Complications in the Last 150 Operations for Carcinoma of Colon* *

	Cases	Mortality
Diffuse peritoneal involvement, exploration only.....	6	0
Associated resection of stomach.....	1	0
Associated resection of ileum.....	8	2
Associated resection of bladder, ileum and colon.....	3	2
Associated resection of bladder.....	4	0
Associated resection of ureter and hysterectomy.....	1	0
Associated resection of bladder, sigmoid and ureter.....	1	0
Associated hysterectomy.....	9	0
Associated anastomosis of ureter and hysterectomy.....	1	0
Secondary ileus, enterostomy.....	8	2
Large abscess of abdominal wall.....	1	0
	43	6

* This does not include 1 patient referred for ureterovaginal and ileoperineal fistulas that had followed proctosigmoidectomy, for which ureterovesical anastomosis and resection of the ileum with end to end anastomosis were followed by recovery.

From the Surgical and Proctologic Departments of Temple University School of Medicine.

Read before the Section on Gastro-Enterology and Proctology at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 15, 1944.

is required the incision is extended to the right through the rectus sheath and, if necessary, the rectus and pyramidalis muscles. For the cecum or the ascending or descending colon an incision is made from the tip of the eleventh rib to a point about 4 cm. below the navel; for the colon and its flexures, from the ninth rib to a point about 3 cm. above the umbilicus on the side of the lesion. Usually the anterior and posterior sheaths of the rectus are divided and the rectus muscle is retracted, the fibers of the external oblique being split. If the cancer is attached to the abdominal wall, infiltrated portions are freely resected and removed with the tumor. If there is a medial scar from a previous abdominal operation, this is excised to avoid the formation of a second scar. For twelve years alloy steel wire sutures have been used, and to a large degree fine alloy steel ligatures, for the abdominal wall.

No eventration has occurred in our series, and unless an infected area has been entered during the operation, primary union and very satisfactory scars are the rule. In case of contamination one or more sump drains are used in the peritoneal cavity, and the outer layers of the wound are drained. After adoption of our suggestion to use wire sutures instead of catgut for the abdominal closure, Dr. Thomas Jones of the Cleveland Clinic reported a reduction in wound infections from 27 per cent to under 1 per cent.[1] With the onset of postoperative infection the wound is laid freely open, and frequently renewed gauze dressings wet with 1 : 500 to 1 : 1,000 bromine solution are applied. This also is a useful dressing in spreading pyoderma and is an excellent deodorant for necrotic wounds and fecal or urinary fistulas. It does not discolor bed linen as does potassium permanganate. From invasion of septic areas we have had very virulent peritoneal and abdominal wound infections occur despite the free local use of sulfonamides.

SEPTIC PERITONITIS

Septic peritonitis from an ulcerating, necrotic carcinoma of the colon is one of the great hazards in its operative removal. The brittle, infiltrated bowel may break open or pull in two during attempts at liberation. The stomach, urinary bladder, small intestine or gallbladder may contain feces and pus from a fistula, or there may be a communicating abscess in the peritoneum or abdominal wall. To expect sterilization by daily irrigation through a defunction-producing colostomy is chimerical, although it may greatly reduce the gross contamination. Like others we have found increase in operative difficulties and mortality from stage procedures. The preoperative administration of succinylsulfathiazole or phthalylsulfathiazole by mouth at present seems of value. We have attempted to sterilize intestinal contents and mucous surfaces about rectal carcinoma locally before operation by irrigation and packing with gauze wet with germicides, using mercurial, strong hypochlorite solutions or tincture of iodine. Of these we prefer a 3.5 per cent tincture of iodine. If an abscess has formed, an attempt is made to remove it intact with the attached section of colon, which usually is feasible if the abscess involves the abdominal wall. With a fistula into a hollow viscus an aseptic *en bloc* removal is preferred. Adherent perforated loops of bowel, bladder and stomach are resected if possible by cautery between clamps. Eight to twelve clamps may be used, and it is desirable to have various sizes of clamps without handles, of the modified de Martel type, available. With them we have found it possible to do a complicated resection without leakage or soiling, using what one of us has previously described as the single clamp method for each final anastomosis.[2]

DRAINAGE

During operation leakage is to be feared, especially from an advanced carcinoma, because of the ulcerated, thinned and brittle intestinal wall, which may perforate, or from outlying areas of infection in lymphatic and other tissues which may be entered in the liberation of the diseased bowel. By avoiding traction on adjacent bowel but applying it rather to peritoneal or mesenteric folds beyond the growth, the danger is reduced. An empty bowel is much safer than one obstructed and distended. Free drainage, however, plays a very important part in the prevention of peritonitis. During the first three days after resection of the large bowel there usually is an exudate of 300 to 800 cc. of blood and serum into the cavity. This is a culture medium so often contaminated as to constitute, if not removed, a great hazard. Our earlier operations with inadequate drainage had a mortality of 16 per cent or more. The present low mortality of the Miles operation we consider largely dependent on the massive drain of rubber and gauze or other material introduced through the perineal wound. The mortality of our pull through type of proctosigmoidectomy fell from about 16 to around 6 per cent with the use of large curved perforated glass or rustless steel tubular drains introduced along the sacrum. If free dependent drainage is not used we introduce through the abdominal wound or a separate suprapubic stab one or more perforated tubular drains of rustless steel, 8 mm. in diameter, with an inner continuously acting suction tube. Beginning with nearly pure blood, the material removed gradually becomes more serous and finally after a number of days may cease to drain, when it is removed. Differing from rubber and plastic drains, which provoke encasing adhesions, this type drains the general peritoneal cavity for four or more days and gives early evidence of hemorrhage, of leakage or of the onset or subsidence of an ileus. Ileus is characterized by a sudden great increase in the amount of serum aspirated from the peritoneum. In several cases in which fecal leakage has occurred after anastomosis these drains have prevented diffusion in the cavity and led to the formation of a narrow fistulous tract which has closed spontaneously.

COLOSTOMY OR APPENDICOSTOMY

Colostomy or appendicostomy is useful for the relief of obstruction due to a carcinoma of the left colon or as a complemental operation in resection of the bowel. The Devine defunctioning procedure may be dangerous when the transverse colon is tense and thinned from distention by fecal material. It then is difficult to suture the arms of the loop together without tearing or puncturing the bowel or to exteriorize the ends of the divided bowel without contaminating the subcutaneous fat. The clamps devised may not be suitable for the individual patient; sinuses or fistulas may persist from the two segments of bowel left implanted

1. Jones, T. E., and others: The Use of Alloy Steel Wire in Closure of Abdominal Wounds, Surg., Gynec. & Obst. **72**: 1056, 1941.

2. Babcock, W. W.: Single Clamp Aseptic Gastrointestinal Anastomosis, Surg., Gynec. & Obst. **75**: 485, 1942.

in the abdominal wall, and the final closure may greatly prolong the patient's hospitalization. As a rule we prefer a simple appendicostomy or cecostomy. The appendix and mesoappendix are pulled through a small stab wound at McBurney's point and a 14 or, preferably, a 16 F. rubber catheter passed into the cecum and tied in. The mesoappendix remains attached to nourish the portion of the appendix within the abdominal wall. The catheter should be tied in with two ligatures, anchored by tying them over dental cotton rolls, and then tested by irrigation to prove its position within the cecum. Unless carefully anchored and viable, the section of appendix may slip back into the abdomen. For decompression the colon may be frequently irrigated with 1 : 10 solution of hydrogen peroxide. After the appendix has adhered in the wound it may be dilated by the daily introduction of catheters of increasing size until, if desired, a 26 or 28 F. is in place.

If the appendix is absent or stenosed, a cone of cecum is pulled through the stab wound and anchored by forceps. Two concentric purse-string sutures are inserted, within which a catheter is introduced, tied in the cecum and the cone of cecum securely anchored by tying the ends of the purse-string sutures over dental cotton rolls.

THE ANAL ORIFICE

In the pull through operation a functional anal orifice is desirable. Our experience has shown that the following features are important to avoid complications:

1. The carcinoma should be at least 5 cm. (2 inches) above the anal ring and without involvement of the pelvic floor. We are indebted to Gilchrist and David, Coller, Kay and McIntyre—as well as Grinnel—for showing that the lymphatic spread of rectal and sigmoid cancer is upward and not toward the perineum and that rarely is there microscopic evidence of malignant cells more than 3 cm. below the growth.[3] With carcinoma of the anus the lymphatic spread is around the inner side of the groin to the medial inguinal lymph nodes, which should be excised.

2. The portion of sigmoid brought to the perineum should have adequate blood supply. This is proved in the abdominal part of the operation by the pulsation of arteries, or, if the blood pressure is low and the vessels are covered by fat, by incising vessels on the bowel after interrupting the blood supply from the anal side.

3. The sphincters always should be divided on one side and the sigmoid should lie so loosely in the anal canal that the finger can be introduced beside it. In every case in which we have brought the sigmoid through a dilated or divulsed sphincteric ring the muscles have contracted, cutting off the circulation, with resulting gangrene of the sigmoid. In such a case, if the anus is not promptly and freely opened, fetid exudate accumulates in the pelvis, with dangerous infection.

4. An end to end anastomosis by suture between the end of sigmoid and the perineal skin or the anorectal mucosa should not be attempted, nor should sutures be used to unite the sigmoid with surrounding perineal structures. The incidence of destructive infection with loss of sphincters and necrosis and retraction of sigmoid were so high in experiences before 1930 that we have since allowed the sigmoid to lie loosely in the perineal opening and projecting from 6 to 9 cm. A 26 or 28 F. rectal tube is tied into the projecting sigmoid, with two heavy ligatures. Several times secondary hemorrhages have occurred from the end of the sigmoid, necessitating an additional ligature. We mention this, as interns usually think the bleeding comes from the perineal wound, which they may tear open and pack unnecessarily. About the sixth day the rectal tube sloughs out at a time when the wound, protected from contamination, has soundly healed. A day or two later the protruding bowel may be removed by a tonsil snare or even with the perineum.

Our first method was to withdraw and exteriorize the large loop of liberated rectum and sigmoid through a median incision running from the margin of the anus to the right side of the base of the coccyx. Dressings were then applied, the purse-string suture removed from the anus, and the loop of bowel cut away and rectal tubes tied in the rectal and sigmoid ends. Later the partitions between the anus and rectal end and the rectal end and sigmoid were divided. For a few patients a later plastic reconstruction was made to form an anal ring. But about 85 per cent of the patients found they could go without a protective pad most of the time, provided they took a quickly acting laxative or enema every second or third day, and felt that a further operation was unnecessary. About 10 per cent without the aid of sphincters are not troubled by soiling provided a nonobstructing opening is maintained. It was necessary to open the perineal wound freely if infection developed. The technic was later changed to a posterior medial perineal incision, the rectum being divided above the sphincters, which were split posteriorly, the protruding sigmoid laid in the anal groove and a large glass drain introduced along the sacrum. The projecting sigmoid was burned off flush with the perineum about one week after the operation. This gave a fairly satisfactory result, but infection in the perineal wound had too high an incidence. A recent modification has been to depend on careful packing of the rectum with 3.5 per cent tincture of iodine gauze, and the preoperative use of succinylsulfathiazole for sterility; to divide the rectal mucosa just above the sphincters, to place the withdrawn sigmoid in the split anal ring, and to close the deep pelvic floor and skin very loosely about the bowel with deep and superficial wire sutures. For drainage an 8 mm. sump drain is introduced through the abdominal incision or a stab wound to the pelvic floor, with continuous night and day aspiration, as long as appreciable quantities of blood and serum are withdrawn. With this method a normal appearing functional anus has been obtained with the fewest urinary or sexual complications. With carcinoma of the anus, this and the pelvic floor are freely excised.

For advanced lesions with infected areas invaded during the liberation, very free open drainage should be employed.

In the last 250 consecutive operations for cancer of the large intestine the operability rate has been high, 96 per cent. No palliative colostomy has been used. Forty-one patients (4 with lymphopathia) have

3. Coller, F. A.; Kay, E. B., and McIntyre, R. S.: Regional Lymphatic Metastases of Carcinoma of Stomach, Arch. Surg. **43**: 748 (Nov.) 1941. David, V. C., and Gilchrist, R. K.: Lymphatic Spread of Carcinoma, Ann. Surg. **108**: 621, 1938. Grinnel, R. F.: Grading and Prognosis of Carcinoma of Colon and Rectum, Ann. Surg. **109**: 500, 1939.

had a permanent colostomy usually made by another surgeon transferred to the perineum or eliminated by excision, intestinal resection and end to end anastomosis. The use of end to end anastomosis has been extended to carcinoma of the sigmoid and upper two thirds of the rectum. By leaving an intact pelvic floor and anus, the bladder and sexual complications incident to the Miles or other abdominoperineal resections are largely avoided. Advanced hepatic metastasis and localized visceral invasion have not contraindicated radical measures, and with single stage procedures the patient usually is able to be out of bed by the seventh or eighth day and to return home by the fourteenth day after operation.

COMPLICATIONS

The Mikulicz, Block or Paul operation has complications which should be understood clearly. It is performed in stages, the completion of which usually requires several months. Even if the patient returns to his home between stages the total period of hospitalization is longer than required with other methods. It usually leaves a weak abdominal scar or hernia. Wound contamination from the exteriorized bowel is fairly frequent. It is chiefly used for removal of the sigmoid but is the least radical of the methods of sigmoidectomy and more subject to local recurrence in the bowel, abdominal wall or mesentery than any other operation. In the loop of bowel to be liberated and exteriorized, 5 to 8 cm. of the arms of the loop left within the abdomen are sutured together to form a spur or partition, 2 to 8 cm. to reach through the abdominal wall and 4 to 8 cm. to project above the surface of the skin. Thus a total of 22 cm. in a thin patient to 48 cm. of bowel and attached mesentery in an obese person may be required for the proper exteriorization of the loop of cancerous bowel, all of which additional bowel and omentum could be removed in a resection with end to end anastomosis. These limitations explain the frequency of recurrences of carcinoma in the abdominal wall, arms of the loop or the underlying mesentery. We have treated these recurrences by a wide *en bloc* excision of the arms of the loop, mesentery and overlying attached abdominal wall, but often the disease had then spread beyond the range of complete operative extirpation. In attempting to remove more of the distal sigmoid or rectum we have exteriorized the lower segment under tension in the grasp of a clamp. In several cases the bowel sloughed loose from the clamp and slipped back into the pelvis, for which free drainage is necessary, a defunctioning transversostomy desirable, to be followed by additional procedures to establish the continuity of the bowel. If the mesenteric sides of the arms of the loop are apposed, the clamp placed on the spur may then cut off the blood supply, with necrosis and perforation. Tubes of glass or rubber introduced through the abdominal wall also may produce necrosis and perforation. We have had glass angle tubes made with bulbous ends to be tied into the bowel and rest above the surface of the wound to avoid the perforation within the abdomen, which may occur with a Paul or Mixter tube. When the arms of the loop have not been sufficiently united by suture, a loop of small bowel may slip within the jaws of the crushing clamp, and a secondary small intestinal fistula may follow. For this the wound should be reopened promptly, and the intestinal orifice closed by suture. This occurred once in our series, following a Mikulicz resection of the transverse colon, with recovery. At present, because of these various objections, we employ the more radical and much more satisfactory single stage resection with aseptic end to end anastomosis for all carcinomas of the large bowel above the midrectum and have discarded the Mikulicz-Paul operation except to terminate quickly an operation with gross contamination.

APPENDICITIS

Acute appendicitis rarely complicates an operation for carcinoma of the large bowel. If left without removal, serious complications may follow such as nearly cost the life of one of our younger patients. Evidence of a subacute or chronic appendicitis now leads us to do a simple appendicostomy, the appendix and mesoappendix being pulled through a small stab wound at McBurney's point.

REMOVAL OF GALLSTONES

Gallstones usually are removed to prevent a cholecystic attack during convalescence. Guided by the hand within the abdomen, a visceral forceps is passed through a short transverse incision, the apex of the gallbladder is exteriorized and aspirated, and the stones are removed by curet, forceps or "milking" and a drainage tube tied into the gallbladder. In an obese patient with a small gallbladder, the skin and fat may be more widely divided to the external oblique, beyond which it may not be possible to exteriorize and anchor the organ. There has been no complication from 7 or 8 of these added operations.

PERMANENT OR PALLIATIVE COLOSTOMY

Fourteen years ago one of us reached the conclusion that a permanent colostomy was not essential in the operative treatment of cancer of the intestine. In 480 consecutive operations for cancer of the large bowel performed since that time a permanent colostomy has not been used. In 3 patients, however, or less than 1 per cent, operative complications have left the patient with a colostomy which, because of evidence of cancer developing in the pelvis, was not closed.

For years palliative operation for ineradicable carcinoma of the large bowel has been a term synonymous with colostomy. Except in the presence of intestinal obstruction, to call colostomy a palliative or relief-giving procedure is an ironic misuse of terms. Colostomy brings gloom and disgust to the unfortunate patient with advanced carcinoma, and a new dependence on others. If the family cannot afford nursing aid, often it refuses to remove him from the hospital until, a constant burden, his demise gives relief to all concerned. As a result, our highest operative mortality for intestinal cancer has followed palliative colostomy. At present our preferred palliative operation is resection of the cancerous segment and end to end anastomosis. This eliminates the loss of blood, the diarrhea or obstruction, the suppuration and septic necrosis of the primary tumor. Even with residual large multiple growths in both lobes of the liver the patient may then show appreciable improvement in appearance, spirits and strength. Such a patient, who had lost 75 pounds (34 Kg.) in weight and had been bedfast for several months, became ambulant in eight days and returned home 300 miles away fifteen days after resection and end to end anastomosis. If the metastatic growths in the liver are small the patient may live

in apparently good health for from two to four years. One considered herself in good health for seven years after the radical resection. Even patients classed as inoperable and treated by a palliative colostomy occasionally may be restored to a period of comfort by elimination of both colostomy and tumor. A physician with metastasis in pelvis and liver, incapacitated for the six months following colostomy, rapidly improved and was able to resume practice for seven months after an end to end resection with removal of the colostomy. Another patient was incapacitated by a very troublesome intestinal prolapse eleven years after a Miles operation. The colostomy was moved from the abdominal wall to the perineum and, although small, slowly growing masses of colloid carcinoma were found in the pelvic floor, the patient became free from fecal leakage. During the seven years which have since elapsed the man has continued to be active; the local growth has again been partly resected but continues to grow slowly, with relatively little inconvenience.

Complications of a perineal colostomy are due largely to sloughing of the terminal bowel and the formation of a stenotic cicatricial opening, which may give the patient much distress. If the anal canal has been removed, every effort should be made to maintain a large perineal opening. With any suggestion of contraction the patient should be supplied with dilators (as a set of test tubes) to be used twice daily until an opening of adequate size is established, after which the dilators should be used every week or month, or whenever there is a tendency to contraction. As with an abdominal colostomy, 85 per cent of the patients need to empty the colon completely by irrigation or by quickly acting saline cathartic every second or third day.

SUMMARY

The adoption of radical excision instead of colostomy for patients with advanced secondary lesions from cancer of the large bowel has increased our rate of operability to over 96 per cent and also our mortality from resection but is considered well worth while. In the last 250 cases 16 (6.3 per cent) were considered inoperable. In the last 150 cases 5 were considered inoperable; 96.7 per cent had radical operations. Sixteen (10.6 per cent) died in the hospital. Deducting 11 with far advanced or ineradicable disease, the mortality was 3.6 per cent. Of the last consecutive 45 patients all had succinylsulfathiazole; 44 had radical resections with 1 death (2.2 per cent), a patient with advanced carcinoma of the liver who had an abdominal end to end anastomosis 5 cm. above the sphincters.

There were 24 end to end aseptic resections over a single clamp, 13 abdominoperineal resections with retention of a functional anus, 3 perineal resections for cancer of the anus and 3 eliminations of a colostomy left by other surgeons. No Mikulicz operation or colostomy was performed. Our tendency therefore is toward a wider use of end to end resection, the preservation of the uninvolved anus and the elimination of the Mikulicz operation except when serious peritoneal contamination renders a rapid termination of the intra-abdominal procedure desirable. In the past 480 operations there were 78 Mikulicz resections with 14 deaths, or a mortality of 17.9 per cent largely the result of serious complications.

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CUTANEOUS MANIFESTATIONS OF THE FUNGI CAUSING DERMATOPHYTOSIS AND ONYCHOMYCOSIS

AND THEIR TREATMENT

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With the demobilization of men and women following World War II, one can expect an increase in the incidence of dermatophytosis, or "athlete's foot," as this common ringworm infection of the feet is popularly known. Between 1940 and 1943 the Navy hospitalized 14,068 patients for fungous infections of the skin,[1] the large majority of them involving the groin and the feet. These patients lost 251,418 days from active service, representing 17.1 per cent of sick days lost for all skin diseases. The incidence of infection not requiring hospitalization is much higher. Since, even in normal times, from 50 to 90 per cent of the young adult population are affected at some period, it is important for the physician in general practice to be able to recognize the cutaneous manifestations of this common fungous infection. Early recognition of the causative fungus and proper therapy will aid materially in shortening the duration of the disease.

Though a ringworm infection of the palm was first observed in 1870 by Tilbury Fox [2] and later, in 1888, Pellizzari [3] reported 7 cases on the palms and soles, it was not until 1892 that a careful and systematic study of 25 cases was made by Djelaleddin-Moukhtar.[4] He was the first to make cultures from scales and vesicular fluid from the hands and feet. Later reports were made in 1908 by Whitfield [5] and in 1910 by Sabouraud.[6] The first in the United States to report cases of dermatophytosis were Montgomery and Culver, Hartzell and Lane. Ormsby and Mitchell [7] in 1916 were the first to make a comprehensive report on the disease. Their paper, which is still one of the best on the subject, covered 65 cases.

Whitfield [8] classified the disease according to its clinical manifestations into three main types, which were the acute vesiculobullous, the chronic intertriginous of the toes and the chronic hyperkeratotic of the palms and soles. The causative organism was generally not known. Ormsby and Mitchell, in their early report, recognized the fact that the invading organism probably was related to the subsequent clinical developments.

It is our purpose in this paper to correlate the cutaneous manifestations of ringworm of the feet and nails with the invading fungi.

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Read before the Section on Miscellaneous Topics, Sessions for the General Practitioner, at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 14, 1944.

1. Sulzberger, M. B.: Personal communication to the authors.
2. Fox, T.: Tinea Circinata of the Hand, Brit. M. J. **2**: 116 (July 30) 1870.
3. Pellizzari, C.: Richerche sul Trychophyton tonsurans, Gior. ital. d. mal. ven. **23**: 8, 1888.
4. Djeladeddin-Moukhtar: De la trichophytie des régions palmaire et plantaire, Ann. de dermat. et syph. **3**: 885, 1892.
5. Whitfield, A.: A Note on Some Unusual Cases of Trichophytic Infection, Lancet **2**: 237 (July 25) 1908.
6. Sabouraud, R.: Sur l'existence fréquente d'un soi-disant eczema des doigts et des orteils, du a l'epidermophyton inguinale, Ann. de dermat. et syph. **1**: 289, 1910.
7. Ormsby, O. S., and Mitchell, J. H.: Ringworm of the Hands and Feet, J. A. M. A. **67**: 711 (Sept. 2) 1916.
8. Whitfield, A., and Sabouraud, R.: Eczematoid Ringworm of the Extremities and Groin, Brit. J. Dermat. **23**: 375 (Dec.) 1911.

At the New York Skin and Cancer Unit tabulation was made of the causative organisms in cases of dermatophytosis between 1935 and 1943 (table 1). Positive cultures from the feet showed that 65.4 per cent were caused by Trichophyton gypseum, 15.7 per cent by Trichophyton purpureum, 13.5 per cent by Monilia albicans and 2.8 by Epidermophyton inguinale. These account for 97.4 per cent of the cases. The remainder were due to unidentified organisms of the trichophyton type or other fungi. Thus four fungi cause practically all the cases of dermatophytosis found in New York and probably throughout the United States. However, the incidence of infection with these fungi varies in different localities; for instance, E. inguinale is more prevalent in France and England.[9]

Fig. 1.—Dermatophytosis of the foot caused by Trichophyton gypseum with dermatophytid on the hand. Note vesicles on foot and hand.

TABLE 1.—*Incidence of Positive Cultures in Dermatophytosis of the Feet and Hands at New York Skin and Cancer Unit, 1935 to 1943*

	Feet		Hands	
	Number	Per Cent	Number	Per Cent
T. gypseum	1,016	65.4	36	12.2
T. purpureum	247	15.7	85	28.7
M. albicans	210	13.5	163	55.1
E. inguinale	44	2.8	6	2.0
Others	40	2.6	6	2.0
T. unidentified	(32)	....	(2)	....
T. niveum	(8)	....	..	....
A. schoenleini	..	....	(3)	....
M. fulvum	..	....	(1)	....
Total	1,557	100.0	296	100.0

In a majority of the infections by a particular organism, certain features predominate so it is possible in most cases to predict the invading fungus without culturing. This is also true of ringworm of the nail, which will be discussed later.

Laboratory examination, both microscopic and cultural, should be carried out to verify the diagnosis.[10]

TRICHOPHYTON GYPSEUM

Trichophyton gypseum, which is responsible for the largest number of infections, causes an acute inflammatory type of dermatophytosis in which vesiculation is the main feature. It may be preceded by slight scaling, maceration or fissuring between the toes for months or even years. In the macerated areas, minute vesicles are present. The infection of the interdigital webs may be irritated or aggravated by local medication, by friction from a shoe, by scratching or by heat, resulting in an acute vesicular or bullous eruption. The vesicles are usually limited to the sole or to the sides of the foot or the bulbs of the toes. More rarely they occur on the dorsum of the foot. The vesicles at first are deeply seated and contain a viscid fluid with very little erythema surrounding them. Later they may become pustular. In the early stage the vesicles appear singly and soon are found in groups. At times, groups of the vesicles coalesce to form extensive patches. The vesicular areas spread at the margin, dry up, scale and clear centrally. An overhanging serpiginous border may remain. Vesicles may reappear in a centrally healed area.

As the vesiclular fluid is absorbed, the vesicles become brown macules and later desquamate. The domes of the vesicles and the scales contain many elements of the fungi and thus are infectious. These vesicles may be secondarily infected with staphylococci or streptococci, causing an acute pustular eruption of the feet, cellulitis or lymphangitis. Even erysipelas or septicemia may result in the rare case.

Fig. 2.—Trichophyton purpureum infection, showing fine branny scales.

The presence of hyperhidrosis is frequently found with this type of dermatophytosis. The sweat produced, especially between the toes, where it is of a higher p_H, acts as a good culture medium for fungi and thus aids in the spread of the disease. Itching may be pronounced. Walking is frequently difficult in extensive cases.

9. Weidman, F. D.: Laboratory Aspects of Epidermophytosis, Arch. Dermat. & Syph. **15**: 415 (April) 1927.
10. Lewis, G. M., and Hopper, M. E.: An Introduction to Medical Mycology, Chicago, Year Book Publishers, Inc., 1943.

TRICHOPHYTON PURPUREUM

In the noninflammatory type of dermatophytosis Trichophyton purpureum is the usual causative fungus.[11] The plantar surface is the common site of infection, although it may involve the side or dorsa of the feet, toes and toe nails. Any part of the hands may also

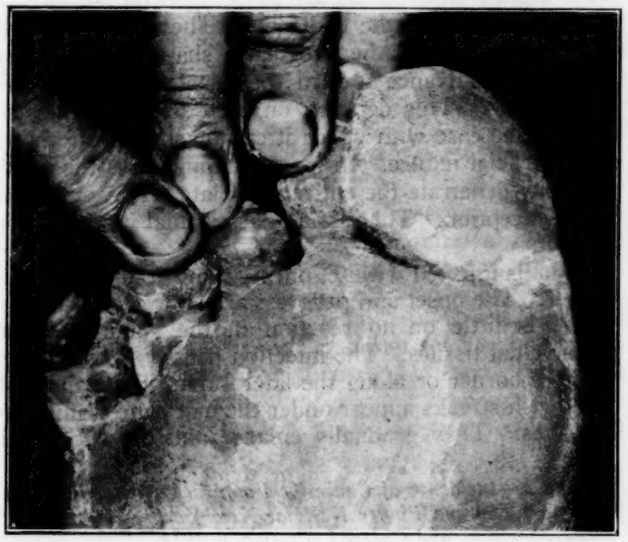

Fig. 3.—Monilia albicans invasion, with maceration in all interdigital webs.

be involved. The entire sole or any part may be the site of infection. When extensive, the infected area spreads up the sides of the foot and heel. This makes a sharply marginated erythematous border, giving a "moccasin" effect to the foot. The infected skin is dull red and slightly thickened. The scaling, which is constant, is usually fine and branny. The absence of visible vesiculation in the presence of itching is a persistent feature. The infected sole is drier than usual. Irregular erythematous scaly patches may be found on the dorsa of the feet and toes. The degree of erythema may vary within a single patch, giving a mottled appearance. There is no tendency to central clearing.

The infection on the under surface of the toes is clinically similar to the plantar infection. Moisture will cause a small degree of maceration in the interdigital areas. If the entire toe is involved, the skin is thickened and dry with fissuring about the dorsal side of the joints. This noninflammatory type of dermatophytosis is more apt to be bilateral and symmetrical than the acute type caused by T. gypseum.

MONILIA (CANDIDA) ALBICANS

Infection of the foot with Monilia albicans, mycologically speaking, is not dermatophytosis because the organism is not a dermatophyte but a "yeastlike" organism. "Moniliasis" is the term used for infections by this organism.[12] It is a common cause of intertriginous infections. This organism is the cause of thrush, pruritus ani, perlèche and intertriginous infections of fingers, toes and other locations. It is included in this paper because it does cause a type of "athlete's foot" which is rather acute and difficult to cure. Diabetes may be a complicating factor in this infection.

When the feet are infected, the characteristic manifestation usually limits itself to the interdigital webs. The skin between the toes is bright red, weeping and fissured at the base. Exfoliated and macerated skin is present at the borders of these denuded or red areas and overhangs it. This infection usually involves both feet and all interdigital webs. Occasionally it extends on to the dorsum of the foot, where the skin may be red and glazed or acutely inflamed. Occasionally vesicles are present on the plantar surfaces, from which this organism may be cultured.

EPIDERMOPHYTON INGUINALE

Epidermophyton inguinale, a cause of ringworm of the groin, also invades the feet. Sabouraud's first report [6] of E. inguinale infection of the feet includes an excellent clinical description. Eight out of 10 cases of intertrigo of the toes he found [8] were caused by E. inguinale. The original site of infection is the base of the interdigital webs, but it ultimately reaches the folds of the flexor surface of the toes. Maceration and severe scaling are characteristic of the infection in the interdigital webs. As the infection spreads on the sole the skin is decidedly scaly with the scales larger and flakier than those found in a T. purpureum infection. Vesiculation may be present, but usually it is not very acute. The vesicles are rather dry and are interspersed in the scaling. As they mature they become small brown macules, which can be easily lifted off. The sole, in some cases, is erythematous. The usual infection limits itself to the toe area, though the entire sole may be involved. Often a concomitant infection of the groin with the same organism occurs.

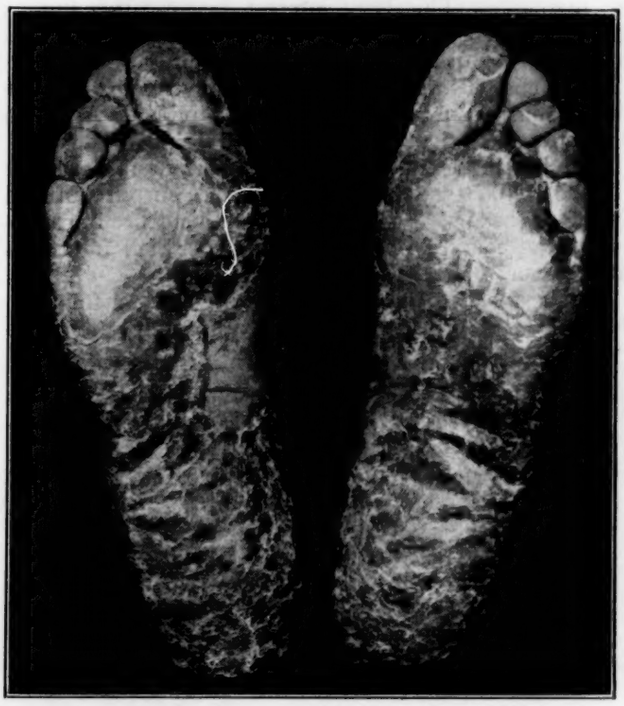

Fig. 4.—Epidermophyton inguinale infection, with scattered vesicles and flaky scaling.

Hand infections may be caused by the same four fungi (table 1). The most frequent causative agent is M. albicans. This organism has been isolated in 55.1 per cent of our cases from the hands. The infection is usually limited to the interdigital webs, where it is known as "erosio interdigitalis blastomycetica." The infection is similar in appearance to that occurring between the toes.

11. Lewis, G. M.; Montgomery, R. M., and Hopper, M. E.: Cutaneous Manifestations of Trichophyton Purpureum (Bang), Arch. Dermat. & Syph. **37**: 823 (May) 1938.
12. Hopkins, J. G.: Moniliasis and Monilids, Arch. Dermat. & Syph. **25**: 599 (April) 1932.

The other organisms also give a similar clinical appearance on the hands as on the feet. As this paper deals with infections of the feet only, hand infections will not be discussed. A detailed report on fungous infections of the hands has been made by Epstein.[13]

Dermatophytid [14] is an allergic response of the skin to fungi or their toxins. It manifests itself by vesicles

Fig. 5.—Leukonychia trichophytica, showing superficial white patches on many nails caused by Trichophyton gypseum.

on the palm and fingers and is usually more pronounced in cases of an acute fungous infection of the feet. For further information there are many excellent articles.[10]

NAILS

Favus of the nails, a type of ringworm, was first described in 1829 by Mahon,[3] which was ten years before Schoenlein described the causative fungus, Achorion. Baum and Meissner in 1853 described molds in the nails.[15] Others mentioned these lesions before the original reports by Fox, Pellizzari and Djelaleddin-Moukhtar on hand and foot infections. Whitfield's first case [5] of onychomycosis of the toe nails was caused by E. inguinale. This is of interest, because this fungus has not been isolated from the nails in any of the cases at the New York Skin and Cancer Unit.

The clinical manifestations of onychomycosis are more constantly similar for the individual organism than for their manifestations on the skin of the feet. The fungi most commonly seen in onychomycosis are Trichophyton gypseum, Trichophyton purpureum and Monilia albicans. Table 2 shows the incidence of causative fungi found in toe nail and finger nail infections at the New York Skin and Cancer Unit.

In the toe nail infections, T. gypseum was found in 63.5 per cent of the cases which were culturally positive, T. purpureum in 25.3 per cent and M. albicans in 5.6 per cent. The remaining 5.6 per cent were caused by unidentified trichophytons, T. niveum and 1 case by Achorion schoenleini (favus).[16]

Fig. 6.—Trichophyton purpureum infection, showing big toe nails undermined and broken off.

In the most common type, that caused by T. gypseum, the infection is usually superficial. Superficial scaling is present. It often starts under the overhanging cuticle. It rarely invades the entire nail plate. There is one type of nail infection with this organism which is very typical, leukonychia trichophytica.[17] In this type small chalky white areas are present on the surface or in the substance of the nail plate. They may be single or multiple and may be irregularly shaped. They may or may not advance toward the distal end of the nail as it grows. This depends on their depth in the nail plate. The ease with which it can be shaved off shows its superficial nature. In long standing cases the infection may penetrate the entire nail plate. However, this is the exception. There is no paronychial inflammation present.

In nails infected with T. purpureum [11] the infection is deeper. The onset and progress are slow and insidious. There is little or no reaction in the subungual and paronychial tissues. The infection usually begins under the free border or along the lateral margins of the nail. Yellowish streaks appear under the nail plate from these locations. They gradually enlarge and the entire nail plate may be involved. The nail plate is loosely attached to the bed above the yellow discolored areas. The nail becomes brittle, dystrophic and loosened from the nail bed. It frequently becomes broken off and it is common to see a nail which is only one half present, the remaining portion of the nail being undermined and appearing both black and yellow from the débris and fungi accumulated there. This appearance is typical of both finger nails and toe nails. Concomitant infection of the toes or sole is usually present.

TABLE 2.—*Incidence of Causative Fungi in Onychomycosis of Toe and Finger Nails at New York Skin and Cancer Unit, 1935 to 1943*

	Toe Nails		Finger Nails	
	Number	Per Cent	Number	Per Cent
T. gypseum	158	63.5	13	2.0
T. purpureum	63	25.3	53	8.1
M. albicans	14	5.6	586	89.2
E. inguinale	0	0	0	0
Others	14	5.6	5	0.7
T. unidentified	(9)	....	(2)	...
T. niveum	(4)	....	..	...
T. violaceum	..	....	(1)	...
A. schoenleini	(1)	....	(1)	...
M. lanosum	..	....	(1)	...
Total	249	100.0	657	100.0

In nails infected with Monilia (candida) albicans the infection usually starts in the lateral nail groove, causing a slightly red paronychial swelling. Thin pus may be discharged from beneath the nail fold. The nail on its lateral border becomes dystrophic, and transverse ridges appear. The nail becomes dark because of débris accumulated under the loosened border. Later the entire nail may become involved. The nail plate in this infection does not become friable, yellow or white, as in Trichophyton infections. It is usually hard and as glossy as a normal nail plate. In toe nail involvement there is usually an infection of the toes. Finger nail infections with Monilia albicans are more common than toe nail infections. However, clinically they are similar. Finger nail infection is common in housewives, dish-

13. Epstein, E.: Dermatophytosis of the Hands, Arch. Dermat. & Syph. **45**: 1113 (June) 1942.
14. Williams, C. M.: The Diagnosis of Some Eruptions of the Hands and Feet, Arch. Dermat. & Syph. **5**: 161 (Feb.) 1922.
15. Heller, J.: Die Krankheiten der Nagel, in Jadassohn, J.: Handbuch der Haut- und Geschlechtskrankheiten, Berlin, Julius Springer, 1927, vol. 13, pt. 2, p. 173.
16. Montgomery, R. M.; Hopper, M. E., and Lewis, G. M.: Favus Involving a Toe Nail: Report of a Case, Arch. Dermat. & Syph. **38**: 856 (Dec.) 1938.
17. Sulzberger, M. B., and Lewis, G. M.: Leukonychia Trichophytica: Report of a Case, M. Rec. **146**: 305 (Oct. 6) 1937.

washers, bakers and persons with similar occupations. Diabetes may also be a complicating factor.

Associated paronychia is a characteristic feature of this, and only of this, mycotic nail infection.

TREATMENT

There are many effective methods of treating dermatophytosis.[18] Intelligent therapy depends on the proper use of drugs in relation to the clinical appearance and identity of the causative organism. Most of the old drugs are still most effective. Variations in the treatment are mainly in cases in which T. purpureum and M. albicans are found or suspected to be the causative fungi.

In T. purpureum infections stronger fungicidal remedies are indicated. Double strength ointment of benzoic and salicylic acid (Whitfield's ointment), consisting of 12 per cent salicylic acid and 24 per cent benzoic acid in petrolatum, tincture of iodine 2 per cent and chrysarobin 3 per cent in petrolatum are all good fungicides and very helpful in these cases. Some cases fail to respond to these medications but respond with the use of stronger applications. Roentgen therapy does not give favorable results in this type of infection.

In M. albicans infection certain drugs are more efficacious than others. For local applications 3 per cent aqueous solution of gentian violet or brilliant green, 5 per cent aqueous solution of silver nitrate and

TABLE 3.—*Mild Fungicidal Ointment*

		Gm. or Cc.
℞	Salicylic acid	1
	Ointment of zinc oxide	15
	Ointment of ammoniated mercury (10%), q. s. ad	30

ammoniated mercury ointment 5 per cent are the drugs of choice. Silver nitrate can also be used in wet dressings in acute cases in 1:5,000 or 1:10,000 dilutions. The aniline dyes or silver nitrate solution tend to dry down the intertriginous eruptions due to M. albicans faster than other drugs. If diabetes is a concomitant condition it must be brought under control.

In cases caused by T. gypseum or E. inguinale the treatment must be varied according to the clinical manifestations.

If there is an acute inflammatory reaction, regardless of cause, soothing remedies should be used. The vesicles or bullae should be drained and wet dressings applied. There are a variety of solutions that may be used. All should be used warm. One may choose from saturated solution of boric acid, Burow's solution 1:20, potassium permanganate 1:2,000 or 1:4,000 and silver nitrate 1:5,000 or 1:10,000. If the infection is very pustular the latter gives the best results. If elevation of the foot is necessary, wet applications are applied; otherwise a foot bath is used.

When using wet dressings intermittently, paste of zinc oxide with 1 or 2 per cent phenol may be used between soakings. In the acute case 1 to 2 per cent aqueous gentian violet or brilliant green may be applied locally.

Indiscriminate use of proprietary remedies may precipitate an acute dermatitis. Many contain a high percentage of salicylic acid, some are alkaline in reaction and others contain a complex organic compound which has a high sensitizing index. The newly popularized phenol-camphor solution has caused many ulcerations. Generally speaking, it is safer to use standard drugs such as those in the National Formulary or the United States Pharmacopeia.

FIG. 7.—Monilia albicans infection, with paronychia and dystrophy of the sides of the nail plate.

As the acute phase subsides, fungicidal remedies may be used. They should not be used in the acute case. This is one of the common mistakes made in the treatment of dermatophytosis. Mild fungicides, such as

FIG. 8.—Severe burn from the application of 50 per cent phenol and camphor solution for "athlete's foot."

gentian violet, brilliant green or one-third strength Whitfield's ointment, may be used twice daily on the affected areas. The ointment given in table 3 is frequently of value as a mild fungicide to tide a case over between the acute and more chronic lesions.

Later stronger fungicidal remedies are indicated. Whitfield's ointment one-half to full strength is helpful. Tincture of iodine 0.5 to 1 per cent may be used. One to three per cent chrysarobin ointment is also helpful.

18. Epstein, E.; Lewis, G. M.; Loveman, A. B.; Pillsbury, D. M.; Schoch, A. G.; Shelmire, B.; Smith, D. C.; Swartz, J. H., and Weider, L. M.: Symposium on the Practical Management of Eczematous Ringworm of the Hands and Feet (Athlete's Foot-Dermatophytosis and Dermatophytids), J. Invest. Dermat. **3**: 523 (Dec.) 1940. Caro, M. R.: Fungous Infections of the Foot, J. A. M. A. **124**: 751 (March 18) 1944.

After the case is clinically cured it is advisable to use a mild fungicide such as one-third strength Whitfield's ointment or the powder mentioned in table 4 a few times a week to prevent recurrences. Sterilization of shoes by means of solution of formaldehyde (U. S. P. XII) and boiling the socks are important.

Prophylactic treatment following a day at the beach or a swim in a pool is advisable. This should be any mild fungicide such as the fungicidal powder.

TREATMENT OF NAILS

It is most important to cure ringworm of the toe nails, for it is a focus of reinfection.

In the treatment of nails there is a wide variety of opinion as to the most efficacious method to be used. Some advise surgical evulsion of the nail. This is a rather radical procedure. The more conservative methods of treatment will accomplish the same result with less pain and discomfort.

It is important in all types of nail infections to remove mechanically as much of the infected portion of the nail as possible. With this procedure the medications applied will be more effective.

In the superficial nail infections the scaly surface of the nail should be shaved off with a scalpel. The white chalky areas may be removed in a similar manner; however, shaving has to be a little deeper. The shaving

TABLE 4.—*Fungicidal Powder*

		Gm. or Cc.
℞	Salicylic acid	2.4
	Tannic acid	8
	Boric acid	36
	Purified talc, q. s.	ad 120

is continued until normal nail plate remains. With this completed, mild tincture of iodine is applied daily to the nail. Other strong fungicides may be applied, but this method is a simple one.

In the deeper nail infections caused by T. purpureum, treatment is more difficult and more tedious. The removal of the infected portions of the nails must be painstaking. For this work a pair of clippers, a scalpel and a small nail chisel are needed. As much of the infected nail as possible must be removed, especially the lateral portion, which may lie deep in the nail groove. Forty per cent salicylic acid plaster is applied to the exposed nail bed and the adjacent nail. A 60 per cent salicylic acid in white ointment (U. S. P. XII) may be spread on the medicated side of the 40 per cent plaster to reinforce its strength, thus making it more keratolytic. The medicated plaster is held in place by adhesive. These applications are changed once weekly following the complete removal of macerated tissue and undermined nail. This procedure is carried out until the nail plate is firmly attached to the nail bed. This will take from four to six weeks. Following this, strong fungicides are applied to the nail. Mild tincture of iodine, 20 per cent silver nitrate solution or 3 per cent chrysarobin ointment may be used. This procedure must be done at each visit to insure a normal nail. With T. purpureum infection, treatment has to continue from four to six months and sometimes longer. However, the interval between treatments can be spaced from two to four weeks after discontinuing the salicylic acid treatment. Roentgen therapy for this type of nail infection has been disappointing.

In Monilia albicans infection of the nails the treatment must be varied. First, mechanical removal of as much of the infected and undermined nail as possible is important. Roentgen rays help in reducing the paronychial swelling. The application in the office of a 10 to 20 per cent silver nitrate solution aids. For daily home applications 3 per cent alcoholic solution of gentian violet or brilliant green or a 5 per cent ammoniated mercury ointment is helpful. In addition, daily scraping with a glass slide of the lateral portions of the nail will aid in removing the infected nail plate. In cases in which pain is present and pus exuding, wet dressings of warm saturated boric acid solution are helpful.

Treatment of concomitant infections of the toes and sole is most important in all cases of ringworm of the toe nails.

SUMMARY

Dermatophytosis is a prevalent mycotic infection. In New York the majority of the cases are caused by Trichophyton gypseum, with Trichophyton purpureum, Monilia albicans and Epidermophyton inguinale causing the rest

Trichophyton gypseum causes an acute inflammatory type of dermatophytosis in which vesiculation is the main feature. Its infection of the nail plate is usually superficial and is manifested by scaling or small irregular white areas.

Trichophyton purpureum produces a noninflammatory dermatophytosis characterized by fine branny scaling and an absence of vesiculation. In nail infections this fungus invades the under portion of the nail, causing yellow undermined areas. The nail plate may be broken off or destroyed.

Monilia albicans infections of the feet are characterized by red and macerated areas usually involving all the interdigital webs. Nails show a paronychial swelling, with the lateral borders of the nail plate ridged and undermined.

Epidermophyton inguinale infection of the feet shows maceration and severe scaling on the toe webs and flaky scales on the sole. Nail infections have not been observed by us.

The basic principle of treatment in dermatophytosis of the feet is the use of soothing wet dressings or pastes in the vesicular stage and of fungicidal remedies after the acute phase has subsided. In the case of infections with Trichophyton purpureum, strong fungicides must be used. In invasions with Monilia albicans, mercurials, silver nitrate or gentian violet is preferred. In onychomychosis it is important to remove all infected nail tissue mechanically before applying fungicides.

CONCLUSIONS

In the majority of cases the invading fungus causes characteristic cutaneous manifestations by which it can be suspected.

Dermatophytosis and onychomycosis should be classified according to the etiologic agent rather than by clinical manifestations.

Early recognition of the invading fungus and intelligent treatment shorten the duration of the disease.

57 West Fifty-Seventh Street—301 East Nineteenth Street.

ABSTRACT OF DISCUSSION

DR. JOHN H. LAMB, Oklahoma City: With the great numbers of American soldiers living in tropical climates with their intense humidity, the treatment of fungous disorders of the feet has been a major problem. The authors have stressed the value of knowing the type of fungus which one is treating. Many physicians have adopted the routine use of the various dye products, gentian violet and brilliant green for all types of dermatophytosis. This is satisfactory in Monilia albicans infection but it will not be curative in the more recalcitrant Trichophyton purpureum. There is no stock prescription for dermatophytosis. All medications revolve on the phases of the infection, whether acute, subacute or chronic, and on the variations of the skin reactions to the fungous toxin. The portion of the paper on nail infections was most correct and practical. In these days of working too fast we find it impossible to take the time necessary for curetting and shaving off the nail from the nail bed. I have been using a very cheap and extremely useful motor driven burr, which in a few minutes will remove almost all of the diseased nail. Locally in some stubborn cases I have found a paste to be efficacious which is composed of chrysarobin powder mixed in a base of pure saponated solution of cresol which has been saturated with salicylic acid. This is applied to the nail bed once every two weeks. The skin and periungual areas are protected by a bland salve.

DR. ARTHUR C. CURTIS, Ann Arbor, Mich.: Dr. Montgomery has described the four fungous infections that comprise almost 98 per cent of the causes of tinea pedis in New York City. In all probability that percentage holds for the University Hospital in Ann Arbor. To one who is not entirely familiar with mycologic terminology and mycologic characteristics the names of these fungi will soon be forgotten. Would it not be better to remember these fungi by the type of reaction that they produce rather than by their generic names and to divide the fungous infections into the acute or inflammatory types, the subacute types and the chronic types? Too often, after the diagnosis of tinea pedis is made, the desire to destroy the fungus takes precedence over the treatment of the reaction that the fungus has produced. The result is that many of these patients will develop a severe dermatitis venenata. Severe types of dermatophytosis frequently are secondarily infected and cellulitis, lymphangitis or erysipelas may be a complicating factor. Again, in many of these cases the etiologic fungus must be forgotten until the secondary infection is controlled. Monilia infections can be of minor importance or they can be very serious; some cases may be fatal. The treatment outlined for monilial infections by Dr. Montgomery is most efficacious. On the other hand, one should not forget that, experimentally and also clinically, monilia infections have been associated with definite riboflavin deficiencies, and in some of these cases that do not respond to satisfactory treatment one should also introduce into the therapy vitamin B complex or riboflavin. Chronic tinea infections of the feet are best illustrated by Trichophyton purpureum and, in my hands, at least, have been extremely refractory to treatment, even with such a remedy as double strength Whitfield's ointment. I should like to ask Dr. Montgomery whether or not, in many of his cases, he actually cures these cases or just arrests the disease temporarily and then at a later date has the patient back on his hands again.

DR. ROYAL M. MONTGOMERY, New York: In answer to Dr. Curtis's question about Trichophyton purpureum infection, it is certainly difficult to cure. In the majority of extensive cases I believe that they are arrested and not cured. Maybe Dr. Lamb can report in another fifteen years how his infection is progressing. As far as nail infections are concerned, it is most important to remove mechanically as much of the infected portion of the nail as possible. Dr. Lamb uses a burr, which is most effective; otherwise one can use a scalpel. But it is always important to remove the undermined portion of the nail and then apply a fungicidal remedy. The remark that Dr. Curtis made about Monilia albicans infection associated with riboflavin deficiency is interesting. We have seen patients with moniliasis at the New York Skin and Cancer Unit who also have a vitamin C deficiency. Probably there is hypovitaminosis in many of these infections.

ORAL ADMINISTRATION OF PENICILLIN

A PRELIMINARY REPORT

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During the early clinical trials, Abraham, Florey and their associates,[1] investigating the various routes of administration of penicillin, tried the oral route and found that the substance was rapidly destroyed by the hydrochloric acid of the stomach. Their attempts to raise the p_H of the gastric contents by the use of sodium bicarbonate were not particularly successful. While they failed to obtain adequate concentrations in the blood after administering solutions of penicillin orally, they were able to recover satisfactory antibacterial amounts in the urine and by this means successfully treated a urinary tract infection in a 6 month old infant. They suggested the use of capsules, but after unsuccessful attempts with phenyl salicylate coated vehicles, abandoned this method. Rammelkamp and Keefer [2] corroborated the previous work of Florey and others [1] in demonstrating the inactivation of penicillin by hydrochloric acid. These investigators administered penicillin by the oral, duodenal and rectal routes. For these experiments they used a solution of 200 cc. of tap water containing 10,000 and 20,000 units of penicillin. Three subjects were given this solution by mouth after fasting for twelve hours. One of the subjects received 4 Gm. of sodium bicarbonate ten minutes prior to the ingestion of the penicillin solution. They concluded that the absorption following oral administration was poor, as demonstrated by the low concentrations in the blood. They also noted that absorption following intraduodenal administration was more efficient than the oral or rectal routes, the serum concentration levels approximating those obtained after intramuscular injection. Rectal administration was found to be unsatisfactory, probably on the basis of the inactivating influence of Escherichia coli.[3]

In 1943 Rammelkamp and Helm [4] reported the results of the oral administration of a penicillin solution containing 1,000 Oxford units per cubic centimeter, giving a total of 20,000 units to 2 patients who had achlorhydria associated with pernicious anemia. The curve of the blood concentrations was greater than that observed in normal subjects and was not unlike that obtained after intramuscular or intraduodenal adminis-

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Dr. Burke is a Teaching Fellow, George Washington University, Department of Pediatrics.
Miss Betty Porter, bacteriologist, and Howard Madigan and George Porter, externs, gave technical assistance.
Drs. Joseph S. Wall, E. Clarence Rice and P. A. McLendon of the Medical Research Committee of Children's Hospital, Washington, D. C., gave helpful suggestions and advice.
This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this article are those of the writers and are not to be considered as reflecting the policies of the Navy Department.

1. Abraham, E. P.; Florey, H. W.; Chain, E.; Fletcher, C. M.; Gardner, A. D.; Heatley, N. G., and Jennings, M. A.: Further Observations on Penicillin, Lancet **2**: 177 (Aug. 16) 1941.
2. Rammelkamp, C. H., and Keefer, C. S.: The Absorption, Excretion and Distribution of Penicillin, J. Clin. Investigation **22**: 425 (May) 1943.
3. Abraham, E. P., and Chain, E.: An Enzyme from Bacteria Able to Destroy Penicillin, Nature, London **146**: 837 (Dec. 28) 1940.
4. Rammelkamp, C. H., and Helm, J. C., Jr.: Studies on the Absorption of Penicillin from the Stomach, Proc. Soc. Exper. Biol. & Med. **54**: 324 (Dec.) 1943.

tration. They also noted that saliva, bile and succus entericus did not exhibit any inactivating influence on penicillin.

The necessity of frequent doses in the parenteral administration of penicillin is obligatory in order to maintain adequate antibacterial levels in the blood.[5] At the present time it is customary to administer penicillin parenterally at least every three hours in order to maintain therapeutic blood concentrations. Even with this regimen there frequently occurs a hiatus of from one-half to one hour between injections, during which time effective blood levels are not demonstrable. Continuous intravenous administration provides more constant concentration, but the incidence of thromboses is great enough to make the intramuscular route preferable.[6] Continuous intramuscular administration has been found to produce considerable discomfort. The disadvantages of such regimens to the patient and to the hospital personnel are manifest. Furthermore, hospitalization is mandatory for these methods of administration.

These inconveniences have stimulated investigation of a simplified method for prolongation of satisfactory blood levels. Romansky[7] has recently shown that single injections of penicillin combined with beeswax and peanut oil will produce and maintain efficient concentrations in the blood for six to ten hours. Chilling of the deltoid region before and after injection, thus producing vasoconstriction as a means of prolonging absorption of penicillin, has been recently recommended.[8] Diodrast[9] or para-amino hippuric acid[10] has been given simultaneously with penicillin, and it has been found that the serum concentrations reached greater heights with prolongation, probably the result of a depression of the excretion of penicillin from the kidneys.

The advantages of the oral route are self evident and require little elaboration. By this method a certain percentage of patients may be treated at home, thus obviating the necessity for hospitalizing every case as is the current practice when penicillin is indicated. Further, the administration of penicillin orally is considerably more convenient and precludes the need for frequent injections. In the past few months commercial production of penicillin has been so accelerated that its greater availability now permits more widespread application. A result of this increased production permits a reevaluation of the feasibility of oral administration.

The present report represents an attempt to ascertain whether or not therapeutic blood levels of penicillin could be obtained by this method of administration.

METHODS AND MATERIALS

It is clear that, to avoid inactivation, penicillin must be protected from the destructive action of hydrochloric acid in the stomach. In addition, penicillin must be absorbed from the small intestine before meeting the inhibitory influence of Escherichia coli. For the purposes of the experiments reported here it was decided to use capsules as a mechanical protection for the penicillin in its passage through the stomach after ingestion.

In preliminary experiments plain gelatin capsules were found to disintegrate promptly when immersed in gastric contents aspirated from normal subjects. Immersion in tap water and saline solution also resulted in the rapid loss of integrity. Because of this the powdered form of penicillin instead of solutions in water or saline solution was used. A method for protecting the integrity of the capsule was devised and consisted in a preliminary hardening by the use of solution of formaldehyde and alcohol immersion. Capsules treated in this manner were stable for one to two hours in aspirated gastric contents. This in vitro experiment does not take into consideration the probably mechanical pressure that is brought to bear on the capsule by peristalsis in the stomach; in vivo, this force could conceivably hasten disintegration. Additional protection was given the penicillin by the use of a double capsule. The contents of an ampule containing 100,000 units of powdered sodium penicillin were transferred to a gelatin capsule (No. 1), which was moistened and sealed and in turn placed in a second capsule of the next larger size (No. 0). It was then placed in solution of formaldehyde U. S. P. diluted 1:20 for five seconds, followed by immersion in 95 per cent alcohol for five minutes. One hundred thousand units of sodium penicillin in the powdered form was adequately accommodated in a No. 1 capsule. Physical transfer of the penicillin involved the loss of a small quantity of the substance; the exact amount was not known, but probably represented about 5,000 units.

In view of the inactivating influence of gastric acidity on penicillin, it was reasoned that neutralization of the hydrochloric acid would reduce this hazard. For this reason, aluminum hydroxide[11] was used, having been selected in preference to sodium bicarbonate, since the latter is known to have a rebound action in producing further stimulation of hydrochloric acid after initial neutralization. In our experiments two aluminum hydroxide tablets, which in preliminary tests were found to neutralize gastric contents within fifteen minutes after ingestion, were swallowed one-half hour prior to taking the penicillin capsules.

It was thought desirable to determine the relation of meals to the oral administration of penicillin, and toward this end four experiments were conducted before meals and six after meals.

The subjects selected were normal men weighing between 165 and 200 pounds (75-91 Kg.). Samples of venous blood were taken at the end of one-half hour, one hour and at hourly intervals thereafter and assayed for penicillin concentrations according to the method of Rammelkamp,[12] using B hemolytic streptococcus 203 as the indicator organism. In one experiment urine samples were similarly collected and assayed.

COMMENT

In our studies a characteristic common in all instances of penicillin given by mouth was the rapid absorption from the duodenum, as indicated by the initial rapid rise within the first half hour; the highest level obtained in all the curves occurred within one-half hour after the capsule was ingested.

In the two experiments when 200,000 units of penicillin was ingested (chart 1), initial levels at the end

5. Keefer, C. S.; Blake, F. G.; Marshall, E. K., Jr.; Lockwood, J. S., and Wood, W. B., Jr.: Penicillin in the Treatment of Infections: A Report of Five Hundred Cases, J. A. M. A. **122**: 1217 (Aug. 28) 1943.

6. Lyons, C.: Penicillin Therapy of Surgical Infections in the U. S. Army, J. A. M. A. **123**: 1007 (Dec. 18) 1943.

7. Romansky, M. J., and Rittman, G. E.: Penicillin: Prolonged Action in Beeswax-Peanut Oil Mixture, Bull. U. S. Army M. Dept., October 1944, no. 81, p. 43.

8. Trumper, M., and Hutter, A. M.: Prolonging Effective Penicillin Action, Science **100**: 432 (Nov. 10) 1944.

9. Rammelkamp, C. H., and Bradley, S. E.: Excretion of Penicillin in Man, Proc. Soc. Exper. Biol. & Med. **53**: 30 (March) 1943.

10. Beyer, K. H.; Woodward, R.; Peters, L.; Verwey, W. F., and Mittis, P. A.: Prolongation of Penicillin Retention in Body by Means of Para-Aminohippuric Acid, Science **100**: 107 (Aug. 4) 1944.

11. Creamalin (Winthrop Chemical Company, Inc., 170 Varick Street, New York).

12. Rammelkamp, C. H.: A Method of Determining the Concentration of Penicillin in Body Fluids and Exudates, Proc. Soc. Exper. Biol. & Med. **51**: 95 (Oct.) 1942.

of a half hour were 9.984 Florey units and 2.496 Florey units. In the instance of the higher level of these two curves, penicillin was taken two hours before dinner. In the second case the capsule was taken one-half hour after dinner. The subsequent levels taken at hourly intervals show a moderately rapid fall closely paralleling each other in these 2 cases. As will be noted, a therapeutic level was present after five and one-half hours in one instance and after four hours in the other.

A similar initial rapid rise during the first half hour was found in the 6 graphs representing the ingestion of 100,000 units of penicillin (charts 2 and 3). In one instance a level of 9.984 Florey units was achieved, in another 2.946 Florey units, in 2 cases 1.248 Florey units, another 0.624 Florey unit and in 1 case 0.156 Florey unit. Therapeutic levels of penicillin were assayable at the end of two hours in all cases. In 3 of these cases it was present in adequate concentrations at the end of three hours and in 1 case at the end of four hours. The appearance of sizable amounts of penicillin in the urine (chart 4) indicates rapid excretion from the kidneys after oral administration.

In two other experiments in which 100,000 units of penicillin was ingested there was no assayable level detected at the end of one hour. The reason for these

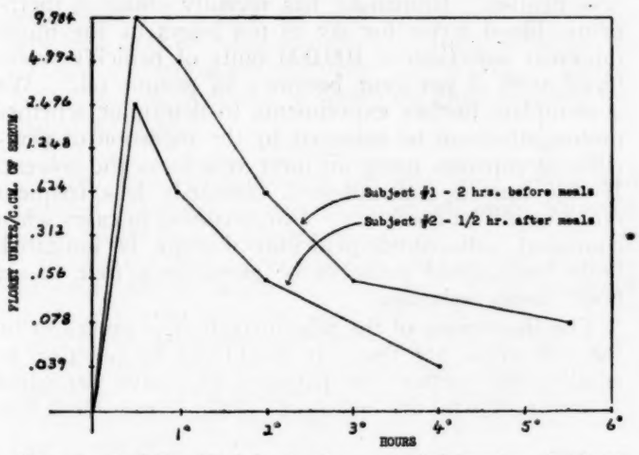

Chart 1.—Penicillin blood levels after oral administration of 200,000 units in a single dose.

two failures is not clear but may represent a premature inactivation of the penicillin in the stomach by hydrochloric acid. It should be noted that in both of these instances the penicillin was taken shortly after meals.

The relationship of meals to the absorption of penicillin must be evaluated, as the prolonged stay of the penicillin capsule in the stomach invites the inactivating influence of hydrochloric acid if the protective capsule is dissolved. As previously noted in a pilot experiment, the formaldehyde-alcohol prepared capsules retained their integrity only for one to two hours in the aspirated stomach contents. Therefore the necessity for the capsules to reach the duodenum within this hiatus is manifest. As already noted, six of our experiments were conducted after meals and the remaining four before meals. No categorical statement can be made on the basis of these experiments, but the impression is that slightly higher penicillin levels were obtained when the capsules were taken on an empty stomach. This is probably accountable on the basis of a more precipitous passage of the capsule into the small intestine from the stomach when the latter is empty. From these preliminary experiments it would seem advisable to administer penicillin orally at suitable intervals before meals. It is further suggested that a diet low in fat content, with high fluid intake, would guard against prolonged exposure to the inactivating influence of the gastric juice. The antacid used in these experiments, aluminum hydroxide, was employed empirically, and the importance of its role cannot be evaluated until further experimentation.

It is interesting to contrast the penicillin levels obtained after oral administration with the levels

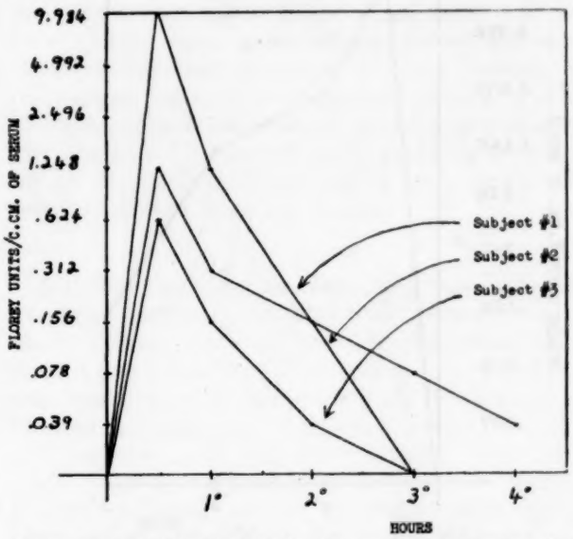

Chart 2.—Penicillin blood levels after oral administration of 100,000 units (one hour before meals) in a single dose.

reported after parenteral injection. The rapid appearance of large amounts of penicillin within the first half hour is common to all three modes of administration (chart 5). After intravenous administration of 40,000 units of penicillin, Rammelkamp [2] noted a very rapid rise in the blood level, the highest point being achieved within the first ten to fifteen minutes, followed shortly thereafter by a rather precipitous fall during the first hour, with only a trace of penicillin detectable after two hours. When 45,000 units was injected intramuscularly [7] the highest level was usually attained in

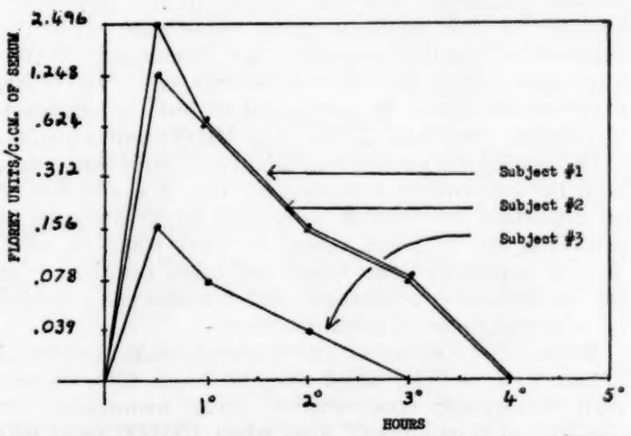

Chart 3.—Penicillin blood levels after oral administration of 100,000 units in a single dose (after meals).

about one-half hour, the rise, as one would expect, being less striking than when given intravenously, and then proceeded to drop more slowly, with detectable levels present at two to three hours. In the present experiments, when 100,000 units was given orally it was somewhat surprising to note the high initial levels after a half hour, indicating a rapid passage of the capsule into the small bowel. Reference to chart 5 shows the

average curve obtained after the ingestion of this amount. The highest level was achieved in about one-half hour, followed by a moderately rapid fall, with assayable levels still present after three or four hours. It is probably fair to conclude that levels obtained when employing the oral route exceeded both in concentration and in prolongation those levels

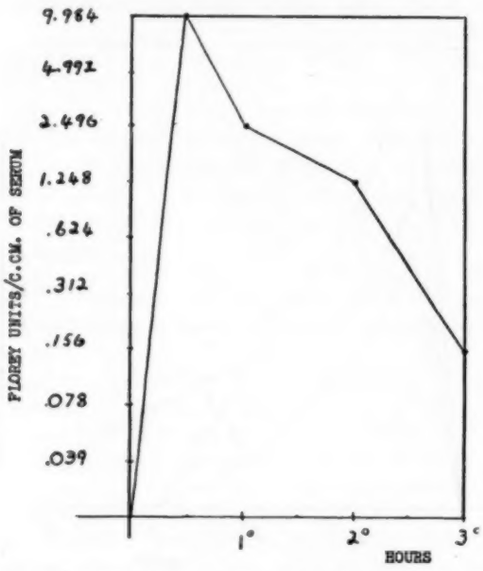

Chart 4.—Penicillin levels in the urine after oral administration of 100,000 units in a single dose.

obtained by parenteral administration when approximately twice as much penicillin is given. It would not seem unreasonable to expect that if comparable doses of penicillin had been used in these experiments the levels would rival those obtained after parenteral administration. Amounts of 100,000 and 200,000 units were used in these experiments rather than smaller doses which might well have been similarly efficacious. It should be noted that no objective or subjective toxic symptoms were produced when these large amounts were ingested. Division of the powdered material into smaller quantities was not feasible in our laboratory because of the physical error associated with the transfer of smaller amounts, due principally to the hygroscopic character of the sodium salt. However, experiments should be performed to test the efficiency of smaller doses with 25,000 and 50,000 unit capsules.

In view of the greater availability of penicillin today, with the consequent reduction in cost, it would not be an important deterrant if somewhat larger amounts of penicillin are required when the oral route is used. This is especially true when one takes cognizance of the incontestable advantages and convenience afforded by the oral route of administration.

When 200,000 units of penicillin was employed (chart 1) it will be noted that the levels were higher, with therapeutic concentration being maintained for one to two hours longer than when 100,000 units was taken, suggesting that the concentration and prolongation of penicillin the blood is more or less directly proportional to the oral dose employed.

The oral administration of 100,000 units of penicillin every three hours in the manner outlined would insure adequate levels in the blood for most susceptible infections. Rammelkamp and Keefer [13] found that the degree of antibacterial action was directly related to the concentration of penicillin in the serum and found the maximum effects against Streptococcus hemolyticus to be in concentrations of from 0.019 to 0.156 Florey unit per cubic centimeter of serum. Against Staphylococcus aureus, slightly higher levels were necessary, at least 0.156 Florey unit being required for a maximum effect.

The feature of a rapid appearance of large amounts of penicillin in the circulating blood was common to oral and parenteral methods of administration. While no harmful effects from relatively high levels have been reported, it is questionable whether concentrations above 0.312 Florey unit per cubic centimeter have any added antibacterial value. It would be distinctly advantageous to secure an absorption curve that would guarantee therapeutic amounts in the serum over a longer period of time. One method of obtaining prolongation would be to administer larger doses by mouth, as evidenced by chart 1, when 200,000 was ingested; therapeutic levels were obtained in these cases for four to five and one-half hours. However, this dosage seems unpractical at the present time. A more plausible method would be one employing an inert vehicle that would slow down absorption from the small intestine and provide a plateau type of concentration curve with prolongation. Romansky has recently obtained therapeutic blood levels for six to ten hours by the intramuscular injection of 100,000 units of penicillin combined with 3 per cent beeswax in peanut oil.[7] We contemplate further experiments to determine whether prolongation can be achieved by the ingestion of penicillin in capsules using an inert vehicle as the solvent. If this can be accomplished, obviously less frequent doses would be necessary. Furthermore, in cases when combined sulfonamide-penicillin therapy is indicated, both drugs could probably be given on a four to six hour dosage schedule.

The limitations of the administration of penicillin by the oral route are few. It would not be practical to employ this method for patients who have persistent vomiting or who are comatose. Also it is evident that

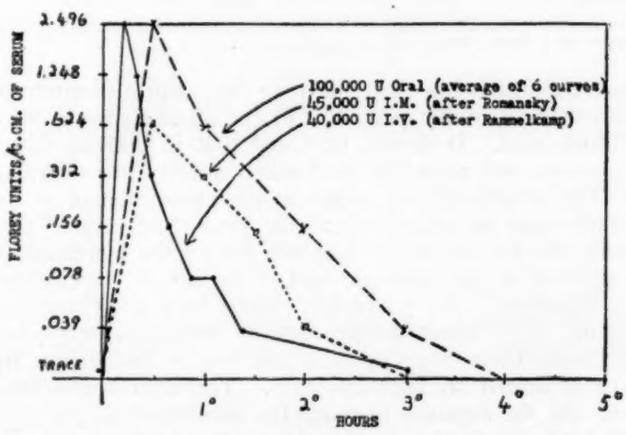

Chart 5.—Comparison of penicillin blood levels after oral and parenteral administration.

ingestion of penicillin capsules would not be satisfactory for infants and very young children, owing to their inability to swallow them with facility.

CONCLUSIONS

1. Adequate penicillin blood levels were obtained by oral administration when the drug was protected from the inactivating action of hydrochloric acid in the stomach.

13. Rammelkamp, C. H., and Keefer, C. S.: Penicillin: Its Antibacterial Effect in Whole Blood and Serum for the Hemolytic Streptococcus and Staphylococcus Aureus, J. Clin. Investigation **22**: 649 (Sept.) 1943.

2. Penicillin concentrations determined after ingestion of 100,000 units compared favorably and in some respects surpassed those obtained after administration of 40,000 units parenterally. When 200,000 units was ingested, higher and longer sustained levels were observed, suggesting that prolongation and blood concentrations are directly proportional to the dosage employed.

3. No objective or subjective symptoms of toxicity were observed after single doses of 100,000 and 200,000 units of penicillin orally.

THE OVERWEIGHT OBSTETRIC PATIENT

LIEUTENANT (jg) LESTER D. ODELL, U. S. NAVY
AND
WILLIAM F. MENGERT, M.D.
DALLAS, TEXAS

Because of a clinical impression that considerable numbers of obese women pass through the obstetric division of the Department of Obstetrics and Gynecology at the University of Iowa College of Medicine, it was decided to review the case histories of all women weighing 200 or more pounds (91 Kg.) at or before birth of a potentially viable baby (1,500 Gm. or more). No record was included in which the child weighed less than 1,500 Gm.

PATIENTS

Seven hundred and sixty records were found and included 641 obese women, of whom 542 were delivered once and 99 two to six times.

During the same period, Jan. 1, 1926 to Dec. 31, 1942 inclusive, 16,644 deliveries took place. The incidence of obese women was therefore 3.85 per cent, or 1:26 (641 obese women), and the incidence of deliveries among obese women was 4.57 per cent, or 1:22 (760 deliveries). These figures represent a greater incidence of obesity than that reported (1:30) by Matthews and Der Brucke.[1]

Fourteen sets of twins, an incidence of 1:54, occurred, making a total of 774 babies born to these obese women during the period of observation. This incidence of twinning is considerably above that generally reported. It may be that the weight of the second twin was sufficient to include a few women in the series when otherwise the antepartum weight would just have failed to reach 200 pounds.

The age, the weight at the time of delivery and the number of previous pregnancies are recorded in tables 1, 2 and 3. It will be seen that the average age at the time of delivery was less than 30 years, the average weight was 224 pounds (101 Kg.) and that only 16.9 per cent of these patients were primigravidas. In other words, these women tended to be relatively young and fertile, since the number of multigravidas was almost five times that of primigravidas.

From the Department of Obstetrics and Gynecology, State University of Iowa College of Medicine.

Read before the Section on Obstetrics and Gynecology at the Ninety-Fourth Annual Session of the American Medical Association, Chicago, June 14, 1944.

This article has been released for publication by the Division of Publications of the Bureau of Medicine and Surgery of the U. S. Navy. The opinions and views set forth in this article are those of the writers and are not to be considered as reflecting the policies of the Navy Department.

1. Matthews, H. B., and Der Brucke, M. G.: "Normal Expectancy" in the Extremely Obese Pregnant Woman, J. A. M. A. **110:** 554-559 (Feb. 19) 1938. Zoller, C. M.: Geburtsverlauf und Wochenbett bei übergewichtigen Frauen, Monatschr. f. Geburtsh. u. Gynäk. **113:** 25-56, 1942.

ANTEPARTUM COMPLICATIONS

Antepartum complications are recorded in table 4. Toxemia of pregnancy was noted 239 times, or 31.4 per cent, a figure in agreement with previous observations. The next most frequent finding was glycosuria. Only 1 woman suffered from diabetes mellitus and another developed it later. Although glycosuria was recorded only when discovered on at least 2 occasions, the presence of sugar in the urine seemed to possess little clinical significance during the period of study. It is possible that glycosuria in these patients merely represented repeated overindulgent ingestion of carbohydrate. The association of hypertensive disease and glycosuria in 53 patients could probably be accounted for on the basis that relatively a large group of these women suffered from the former.

LABOR

Although attention has repeatedly been called to the excessive frequency of abnormal presentation in the obese woman, the experience of this series (table 5) does not confirm the observation. It will be noted that breech alone presents a slightly elevated incidence. Occiput posterior was diagnosed at the end of labor and therefore was not as frequently recorded as it might have been if noted at the onset. Perhaps the greatest difficulty caused by obesity with regard to presentation and position lies in the difficulty of diagnosis. With normal landmarks obscured by intervening layers of adipose tissue, it is difficult for the obstetrician to be certain of any palpatory findings.

There has been considerable discussion of the relation of obesity to length of labor. Eight and one-tenth per cent of the labors of this series lasted less than three and 95.0 per cent less than thirty hours. On the other hand, prolonged labor, thirty or more hours, occurred 38 times (5.0 per cent), a second stage of two or more hours 31 times (4.1 per cent) and a third stage, of thirty or more minutes, 32 times (4.2 per cent).

Postpartum hemorrhage, 600 cc. or more, was noted in 54 patients (7.1 per cent) and necessitated the Credé maneuver in 7 and manual removal of the placenta in 3 patients. Usually accepted incidences of postpartum hemorrhage vary between 5 and 6 per cent.

OPERATIONS

The operative incidence (table 6) is approximately twice the usual clinic incidence. This figure is not as high as others[1] previously reported. Two of the 8 versions and extractions were performed electively on the second twin. Almost half of the operations were low forceps necessitated by prolongation of the second stage of labor.

One of the more serious complications of labor occurred in G. H., aged 35, octigravida, septipara, weighing 240 pounds (109 Kg.). At the end of a prolonged labor an unsuccessful midforceps operation followed by version and extraction resulted in a complete uterine tear 7 cm. long but not involving the cervix. Her course following subtotal hysterectomy was febrile, but she was discharged on the nineteenth day. The child, which was hydrocephalic with a meningomyelocele, was stillborn and macerated.

THE CHILD

The average birth weight was 3,580 Gm. (table 7), confirming the general opinion that obese women tend to give birth to large babies. Approximately 57 per cent of the infants weighed more than 3,500 Gm. at

birth. Thirty-five of the infants died, a mortality rate of 4.5 per cent. This figure is only slightly more than infant mortality rates for 1942 for the country at large. Table 8 gives the cause and time of death. Twenty-six were stillborn and 9 died during the neonatal period. Of the 26 stillborn babies, 15 died before the onset and

TABLE 1.—*Age*

	Patients	
	Number	Per Cent
Less than 20 years	59	7.8
20 to 24 years	195	25.6
25 to 29 years	193	25.4
30 to 34 years	137	18.0
35 to 39 years	116	15.3
40 to 44 years	56	7.4
45 years and over	4	0.5
Total	760	

Average age at the time of labor, 29.1.
Median age at the time of labor, 28.3.

11 during the course of labor. A relatively high proportion of intrauterine death (43 per cent) is evident and probably related, at least in part, to the increased incidence of hypertensive disease. There is a strikingly low incidence of death from immaturity, another expression of the general tendency of these babies to be large at birth. Of the live born children 60.8 per cent were wholly and 25.1 partially breast fed, while 14.1 per cent were artificially fed.

PUERPERIUM

Puerperal complications, chiefly sepsis, occurred in 96 women, a morbidity incidence of 12.6 per cent. Nonfatal embolus and thrombophlebitis each occurred in 1 patient.

There were 4 maternal deaths, 0.53 per cent, a figure twice as great as the maternal mortality rate for 1942 for the country at large. However, it should be remembered that the time interval of the present series dates to Jan. 1, 1927 and that comparison with mortality rates of 1942 is not necessarily accurate. Brief histories of each of these fatalities follow:

1. L. G., a sextigravida, quadripara aged 40, was admitted Jan. 22, 1933 in labor at term with a temperature of 102 F.,

TABLE 2.—*Weight*

	Patients	
	Number	Per Cent
220 to 224 pounds	497	65.1
225 to 249 pounds	174	22.9
250 to 274 pounds	61	8.1
275 to 299 pounds	24	3.2
300 pounds and over	4	0.5
Total	760	

Average weight at time of labor, 224.6 pounds.
Median weight at time of labor, 219.1 pounds.

cough, hemoptysis and cyanosis. Death ensued twenty-seven hours after a brief labor and was thought to have been caused by influenzal pneumonia.

2. M. B., a tertigravida, secundipara aged 26, was delivered spontaneously on March 30, 1936 of a normal child. Immediately post partum a preexisting third degree tear was repaired. The patient developed sepsis and clinical signs of peritonitis and died on the seventh postpartum day.

3. E. G., a primigravida aged 27, developed sepsis after a normal, spontaneous labor. Autopsy on the fourteenth postpartum day revealed generalized peritonitis, acute endometritis, myometritis and bronchopneumonia. The causative organism was a hemolytic streptococcus.

4. R. H., a septigravida, sextipara aged 40, was admitted on July 16, 1938 at term with a normal blood pressure, 1 plus albuminuria and edema of the ankles. Twelve days later a routine medical induction with premature artificial rupture of the membranes was followed by a thirty-two hour period of latency during which the patient developed a fever of 104.6 F. She suffered acute circulatory collapse immediately after a twelve hour labor and developed anuria, from the effects of which she died on the thirteenth day. Since no autopsy was permitted, the cause of the anuria was not ascertained.

REPEATED PREGNANCY IN OBESE WOMEN

Ninety-nine of the obese women of the present series were delivered in the clinic two or more times. Eighty-five were delivered twice, 11 three times and 1 each four,

TABLE 3.—*Previous Pregnancies*

	Patients	
	Number	Per Cent
0	129	16.9
1	115	15.3
2	109	14.3
3	90	11.8
4	68	8.9
5 or more	249	32.8
Total	760	

TABLE 4.—*Incidence of Antepartum Complications*

	Patients	
	Number	Per Cent
Toxemia of pregnancy	239	31.4
Hypertensive disease	208	27.4
Preeclampsia	29	3.8
Eclampsia	2	0.3
Glycosuria *	162	21.4
Anemia †	32	4.2
Contracted pelvis	5	0.6
Miscellaneous ‡	5	0.6
Hypertensive disease and glycosuria	53	7.0

* Presence of 1 plus sugar in urine on at least two occasions. One of these patients subsequently developed diabetes.
† Less than 10 Gm. or 70 per cent hemoglobin.
‡ Includes placenta previa, pyelitis and 1 patient with diabetes.

five and six times. In all, 218 deliveries resulting in 223 children (5 sets of twins) were observed among these 99 women. One of the mothers, previously mentioned, died of influenzal pneumonia following the second delivery at University Hospitals. Eleven (4.9 per cent) of the 223 infants succumbed.

Only 16 (16.2 per cent) of these 99 women went through successive pregnancies without a single adverse incident. Twenty-nine (29.3 per cent) were free from complication in all but one of the observed pregnancies. In the latter group the complications in order of frequency included glycosuria in 8 women, hypertensive disease, postpartum hemorrhage and breech presentation in 4 each, occiput posterior in 3, prolonged labor in 2 and fetal death, maternal sepsis, anemia and preeclampsia in 1 each.

As pregnancies were repeated, the incidence of glycosuria decreased but the incidence of hypertensive disease, fetal death and breech and occiput posterior presentation increased.

The maternal weight tended either to remain stationary or to increase from pregnancy to pregnancy, but there was no observable change in the infant birth weight.

The only patient in the series to have six deliveries at the University Hospitals lost the third and the sixth child. The first pregnancy was without incident. Glycosuria was observed in the second and fourth, but in no other. Hypertensive disease developed during the fifth and resulted in the antenatal death of the infant during the sixth pregnancy. Her weight increased some 50 pounds (23 Kg.) during the period of observation.

COMMENT

There seems to be little doubt that obesity increases the hazards of childbearing. Of these, hypertensive disease is outstanding since nearly one third of the patients suffered from it. Intervention at labor was more frequently necessary and the children were larger

TABLE 5.—*Presentation*

	Patients	
	Number	Per Cent
Occiput anterior	665	87.5
Occiput posterior *	50	6.6
Breech	42	5.5
Transverse	2	0.3
Face and brow	1	0.1
Total	760	

* Delivered as such.

TABLE 6.—*Labor*

	Patients	
	Number	Per Cent
Spontaneous	687	89.0*
Operations aimed at delivery	85	11.0
Forceps, low	39	5.1
Forceps, mid	14	1.8
Breech extraction	14	1.8*
Cesarean section	9	1.2†
Version and extraction	8	1.0†
Craniotomy	1	0.1
Operations during third stage	10	1.3
Credé	7	0.9
Manual removal of placenta	3	0.4

* Five times on second twin.
† Two times on second twin.

than average. The maternal death rate was twice normal expectancy, but the fetal death rate was not greatly elevated.

Although minor deviations tended toward the abnormal, there were no outstanding departures from normal other than those previously mentioned, namely, hypertensive disease, glycosuria and an increase in the operative incidence, maternal mortality rate and average infant birth weight. This is not entirely in agreement with previous reports.[1] In this connection it should be emphasized that the women of this study were essentially young. One third of them were less than 25, more than one half less than 30 and three fourths under 35 years of age. Obesity with them was not a disease of advancing years but was present from early adolescence. More and more it is becoming apparent that youth is an ally of both primigravid and multigravid women.

Considering the obesity, the fertility of this group was astonishing. Although figures were not analyzed for more than five previous pregnancies, it is possible to say that these women gave birth to at least 2,120 children before coming under observation. Together with the 774 babies born during the period of observation, there is a total of 2,894 infants produced by 641 obese women, or an average of 4½ apiece. Surely these figures should make one question the often repeated statement that "obese patients are more frequently sterile than women with normal weights." [2]

TABLE 7.—*Infant Birth Weight*

	Number	Per Cent
1,500 to 2,499 Gm.	28	3.6
2,500 to 2,999 Gm.	89	11.4
3,000 to 3,499 Gm.	217	28.0
3,500 to 3,999 Gm.	265	34.3
4,000 to 4,499 Gm.	137	17.7
4,500 to 4,999 Gm.	29	3.7
5,000 Gm. and over	9	1.2
Total (14 sets of twins)	774	

Average weight, 3,580 Gm.
Median weight, 3,600 Gm.

CONCLUSIONS

1. The incidence of obese women (200 or more pounds) among obstetric patients at the University of Iowa was 1 : 26.

2. The average age at the time of labor was 29.1 years.

3. The incidence of hypertensive disease was 27.4 per cent and of all the toxemias of pregnancy 31.4 per cent.

4. The incidence of breech presentation was slightly increased (5.5 per cent), but otherwise there was no increased rate of abnormal presentation.

5. Operations aimed at delivery were performed in 11.0 per cent of the labors.

6. The average weight of the newborn was 3,580 Gm.

7. The maternal and fetal mortality rates were 0.53 and 4.52 per cent respectively, and the maternal morbidity rate was 12.6 per cent.

8. Ninety-nine women were observed in successive pregnancies. The incidence of hypertensive disease, fetal death and breech and occiput posterior presentations tended to increase with repeated pregnancies.

TABLE 8.—*Cause and Timing of Fetal Death*

Antenatal		Intrapartum		Neonatal	
Macerated, no other finding	9	Birth injury (including 1 craniotomy)	6	Birth injury	5
Maternal toxemia	3	No apparent cause	3	Atelectasis	1
Maternal diabetes	1	Intrapartum infection	2	Immaturity	1
No apparent cause	1			No apparent cause	1
Anencephaly macerated	1			Tracheoesophageal fistula	1
Total	15	Total	11	Total	9

9. Each of the 641 women of this series produced an average of 4½ babies by the conclusion of the period of observation.

2211 Oak Lawn Avenue.

2. Møller, C. E.: Course of Pregnancy, Labor and Puerperium in Overweight Primiparas, Acta obst. et gynec. Scandinav. **18**: 226-236, 1938.

ABSTRACT OF DISCUSSION

DR. FREDERICK H. FALLS, Chicago: With the endocrine imbalance which probably accounts for the obesity of a number of these patients, it is not surprising that a glycosuria might be present in an unusual percentage. It would be interesting to know what the sugar tolerance of those not showing glycosuria might be. The relative infrequency of abnormal presentations corresponds with my experience. The conservative treatment based on the uncertainty of diagnosis possibly may have permitted spontaneous correction of some of the malpositions during the early part of the labor, which may give us food for thought in the management of some of the less obese patients. The incidence of postpartum hemorrhage may have been kept to a low level for the same reason. That the children from these women would be relatively heavy is to be expected. It would be interesting to know in this connection what patients delivered prematurely, what at term and what of them went to postmaturity. Also the fact that 85 per cent of these women were able and did nurse their babies at least in part is instructive. The effect of the obesity on the cause of death in the 4 cases described is not at all clear. Case 1 was evidently a nonobstetric death due to pneumonia. Case 2 was due to an error in obstetric judgment in repairing a previously existing third degree tear at the time of delivery. Case 4 might be legitimately charged as an obstetric death, but the propriety of rupturing the membranes when the patient was obviously not ready to go into labor might be questioned. Case 3 must be accepted as an obstetric death. The fact that all these deaths were associated with infection suggests that obesity might have some depressant action on the immunity mechanism of this group of women. The morbidity rate of 12.6 per cent also suggests this possibility. The lesson to be learned from analysis of such a series is that conservative management will give the best results. Most of them will deliver spontaneously or with low forceps if allowed to do so. Watch for toxemia as a cause of overweight. Avoid any manipulation that may introduce infection, because these women stand infection poorly. As a corollary of the last statement give penicillin, if available, and the sulfonamides, if not, prophylactically in adequate dosage to patients even suspected of having infection.

DR. NEWLIN F. PAXSON, Philadelphia: My attention was first drawn to this interesting subject in reviewing for the Philadelphia Maternal Mortality Committee a series of fatalities of hypertension and pregnancy. In a series of cases in Philadelphia it was found that approximately 25 per cent could be labeled as obese; consequently I have been particularly interested in these cases and have observed some of the common abnormalities during pregnancy and delivery. I have observed particularly hypertension and glycosuria as the most common complication during pregnancy. During labor I have observed a high incidence of uterine inertia with poor uterine contractility, which may be one factor in causing prolonged labor. I also have found a higher incidence than usual of abnormal pelves, particularly of the android type, which may account for some forms of dystocia. Post partum I have found a higher incidence of hemorrhage and a greater tendency toward sepsis, so that all cases of obesity that come to our clinic have been listed as potential danger cases requiring particular study and they are held under closer observation than the average. The cases that tax surgical judgment to the utmost are those of spontaneous premature rupture of the membranes before the onset of labor, with a greater incidence of sepsis and a long, slow labor. These are viewed with extreme respect, and I should like to ask Dr. Mengert how he would suggest that such difficult cases be handled.

DR. WILLIAM F. MENGERT, Dallas, Texas: There is an increased hazard with the obese pregnant woman, but we have tried to emphasize that this hazard is not overwhelming, that it is possible for the woman to conceive, to give birth to a great many children and still remain alive. I wonder if endocrine imbalance has a great deal to do with glycosuria in these patients, because it has always seemed to me that pregnancy represents a high function of the endocrine system, and imbalance is usually represented by failure to conceive or go to term if conception takes place. I have felt that in this series we are dealing with young women who enjoy excessive eating and have done so since early adolescence. Regarding case 2 and the error in obstetric judgment in repairing a complete tear post partum, I believe that in many quarters this is accepted practice, and the question that arises is Might not the woman have developed sepsis had her tear not been repaired? There is always criticism concerning the matter of elective, premature, artificial rupture of the membranes, but I should like to point out that in case 4 there was valid indication, since mild toxemia was present, with edema and albuminuria. Regarding Dr. Paxson's question concerning management of a patient with spontaneous premature rupture of the membranes followed by a long latent period, that is an extremely difficult problem. These women are prone to develop infection, and some recent work by the co-author of this paper shows that with sepsis developing before or during labor the fetal mortality rate is alarmingly high. In some 180 such patients approximately 50 per cent of the babies died, chiefly from septicemia or pneumonia. I think that effort should be made to get that patient into labor and then treat her by as conservative obstetric principles as possible. Regarding the high incidence of abnormal pelves in hypertensive women in Philadelphia, I wonder if this has any special association with obesity.

Clinical Notes, Suggestions and New Instruments

PRETIBIAL FEVER

LAURA L. LIPSCOMB, M.D., NEW HAVEN, CONN., AND JEAN L. McMAHON, M.D., MINNEAPOLIS

Pretibial fever, by name, is a new disease. Daniels and Grennan [1] in 1943 reported an epidemic among men in an army camp. An outbreak of a febrile disease with similar clinical features and known locally as "Brushy Creek" fever was described by Bowdoin [2] in 1942 as possibly a new disease entity.

The following case, which clearly falls into this clinical category, is reported because (1) it is unusual in its isolated occurrence, and (2) it presents an additional feature not hitherto noted:

REPORT OF CASE

History.—F. H., a white boy aged 10 years, was admitted to the New Haven Hospital on Aug. 29, 1944 with fever, nausea and pain in the extremities. He was well until two days before admission, when he became feverish and anoretic. A sensation of stiffness of the upper extremities developed and he complained of shooting pains down his arms on motion. The following day the symptoms persisted and the patient was nauseated. During the afternoon there were "stabbing" pains in the lateral aspect of both thighs on walking. On the third day of illness the pain in the extremities was less severe but he remained anoretic and feverish. The family physician examined the child and found spasm of the back muscles and a rectal temperature of 102 F. A tentative diagnosis of acute anterior poliomyelitis was made and the patient was admitted to the New Haven Hospital.

Examination.—At the time of the child's admission his temperature was 103.3 F. and the pulse rate was 96. He appeared

From the Department of Pediatrics, Yale University School of Medicine, and the Children's Clinic of the New Haven Hospital.

1. Daniels, W. B., and Grennan, H. A.: Pretibial Fever, J. A. M. A. **122**: 361 (June 5) 1943.

2. Bowdoin, C. D.: A New Disease Entity (?), J. M. A. Georgia **31**: 437 (Dec.) 1942.

moderately ill. There was mild injection of the pharynx, spasm of the erector spinae muscles with pain on anterior flexion of the spine, and slight spasm of the hamstring muscles bilaterally. The neck was supple and there was no rash.

The admission total white blood cell count was 8,100, with 71 per cent polymorphonuclear leukocytes, 21 per cent lymphocytes, 7 per cent monocytes and 1 per cent basophils. There was no anemia. The blood Kahn reaction was negative. Rhinopharyngeal cultures contained no pathogens, and blood culture was sterile. There was a transient 1 plus albuminuria, with normal microscopic findings. Lumbar puncture was performed on admission and revealed clear fluid under normal pressure. There were 5 white cells per cubic millimeter, all of which were lymphocytes. Stained smear of the spinal fluid showed no organisms, and cultures were sterile. The spinal fluid contained 52 mg. of protein and 81 mg. of sugar per hundred cubic centimeters. The result of the Lange colloidal gold test was 4555555543. The spinal fluid Wassermann test gave a 4 plus reaction with cholesterinized antigen and no reaction with alcoholic antigen. Lumbar puncture was repeated on the third hospital day and clear spinal fluid containing 5 lymphocytes per cubic millimeter was obtained. Protein was 21 mg. per hundred cubic centimeters and sugar 59 mg. per hundred cubic centimeters. Cultures were sterile. The Wassermann and colloidal gold tests were not repeated at this time. Intracutaneous tests with old tuberculin were negative through 1.0 mg. Agglutination tests for the typhoid-paratyphoid group, brucella, Proteus OX 19 and heterophile antibodies were done on blood samples taken on the fifth, twenty-sixth, sixty-second and one hundred and tenth days after the onset of the disease and were negative.

Course in the Hospital.—During the first two days of hospitalization the patient's temperature ranged from 100.8 to 103.3 F. He remained moderately ill. On the afternoon of the third hospital day (fifth day of illness) he had a chill and his temperature rose to 105.8 F. A blood culture taken at this time was again sterile. Shortly after the chill an exanthem vaguely resembling erythema nodosum and characterized by numerous erythematous, slightly raised, nontender lesions was observed over the pretibial surface of both legs. The lesions varied in size from 1 by 1 to 2 by 2 cm. except in areas where they were coalescent. The involved areas felt warmer than the adjacent normal skin and blanched on pressure. On the following day (sixth day of illness) the rash persisted and a few similar lesions were observed on the posterior and lateral aspect of the legs and the distal, anterior aspect of the thighs.[3] The temperature remained elevated between 102.2 and 106 F. and the spleen became palpable. On the seventh day of illness the patient was essentially afebrile until in the evening, when the temperature rose and remained between 100 and 102.2 F. during the following two days. The rash had faded considerably on the seventh day but on the eighth was more brilliant than ever. Subsequently it faded and was not apparent after the ninth day. There was no associated inguinal lymphadenopathy, and an enanthem was never observed. The patient became afebrile on the tenth day and remained so. He was discharged home two days later. The spleen was not palpable at this time.

The patient was examined in the Pediatric Dispensary of the New Haven Hospital on the twenty-sixth, sixty-second and one hundred and tenth days after onset of the disease. On each occasion he appeared well and was asymptomatic, and physical examination revealed no abnormality. Total blood leukocyte counts were 3,600, 7,000 and 7,600 per cubic millimeter respectively. On the one hundred and twenty-eighth day after the onset of the disease the patient returned for repeat lumbar puncture. Clear spinal fluid containing 2 lymphocytes per cubic millimeter was obtained. Protein was 21 mg. per hundred cubic centimeters, sugar 52 mg. per hundred cubic centimeters and chloride 127.6 milliequivalents. Colloidal gold and Wassermann tests were negative.

The parents and 3 siblings of the patient remained well. There was no known similar disease in the locality.

3. The diagnosis of pretibial fever was first suggested by Dr. Dorothy Horstman of the Section of Preventive Medicine, Department of Internal Medicine, Yale University School of Medicine.

COMMENT

The case presented is a classic example of pretibial fever. Daniels and Grennan[1] first described this disease by name in their report of an epidemic febrile illness which occurred in 40 soldiers at Fort Bragg, North Carolina. It was so named because the most striking finding was an erythematous, nonpetechial rash which appeared about the fourth day of illness and which was solely or predominantly pretibial in distribution. Other typical features were abrupt onset, myalgia, splenomegaly, bradycardia and leukopenia. The etiology and mode of transmission of the disease could not be determined despite extensive studies.

Previously Bowdoin[2] in 1942 reported an outbreak of a febrile illness which he considered to be a new disease entity and which may have been pretibial fever. The general clinical picture in these cases was compatible with this diagnosis. An

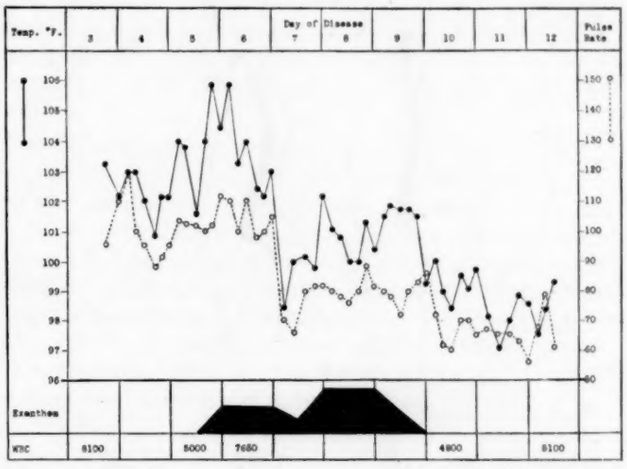

Fig. 1.—Clinical course of patient during period of hospitalization.

exanthem was observed in only 9 of the 35 cases, but in 8 cases it was solely pretibial in distribution.

At the present time the diagnosis of pretibial fever must be made on the basis of history, physical findings and clinical course. The nature of the morbid process may well remain an enigma until the appearance of the characteristic rash.

Also, in the absence of the typical exanthem, sporadic cases cannot be recognized. It should be mentioned in this connection that Greenfield[4] described as an example of pretibial fever a case in which the rash was atypical as to type and distribution and which presented other such unsual features as generalized lymphadenopathy and pneumonitis with fatal termination.

If a diagnostic test becomes available, less clinically obvious cases may be included as examples of pretibial fever. For that matter, the possibility exists that pretibial fever is not a specific disease entity. In the meantime this clinical classification tends to focus attention on such cases so that they can be studied in more detail.

SUMMARY

A case of pretibial fever, observed in a 10 year old boy, was unique in its isolated occurrence. Though some of the previously reported cases have shown nuchal rigidity, this is the first in which abnormalities of the spinal fluid have been found, namely increased protein content and positive colloidal gold and Wassermann tests.

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CORRECTIVE CAST FOR TREATMENT OF LOW BACK PAIN

EMIL D. W. HAUSER, M.D., CHICAGO

Low back pain, in most cases, is due to a strain which causes an inflammation in the region of the lumbosacral and sacroiliac articulations. Strain is the result of an imbalance between the capacity of the structures of the back and the physiologic demands made on them. This imbalance is called a functional decompensation. A decompensation of the back gives rise to certain symptoms and findings.

The symptoms are low back pain and tiredness; this fatigue of the back is often associated with a general fatigue. The first pain noted is usually generalized and is in the muscles, with associated stiffness on arising after rest. Later the pain localizes and may involve the lumbosacral angle or the sacroiliac joint. In the acute phase of this condition there is a sudden "catch," associated with lumbar muscle spasm, loss of the lumbar curve, a protective list with a pelvic tilt, limitation of motion in the lumbar area and a positive Laségue sign. Paresthesia along the course of the sciatic, lateral cutaneous and gluteal nerves is a frequent complication. This is a referred

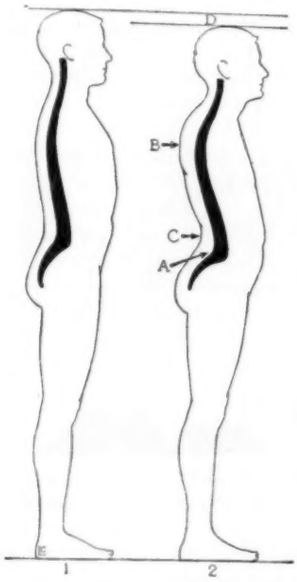

Fig. 1.—Good posture with normal anteroposterior curves.
Fig. 2.—Poor posture with increase of anteroposterior curves.

pain due to repeated stimuli caused by the strain and inflammation of the joint with a low threshold of the nervous system. Decompensation causes a sagging of the back with an increase of the normal curves, dorsal kyphosis and lumbar lordosis. The lumbosacral angle becomes more acute and the shearing force is increased. This produces strain on the lumbosacral and sacroiliac joints, with inflammation of the ligaments and articular surfaces.

The treatment of low back pain, therefore, consists in correction of the deformity, relief of the strain at the sacroiliac and lumbosacral joints and elimination of the decompensation of the back. This is accomplished by means of a so-called active cast. An active cast is one which is applied with the body in a position such that the natural forces of the body will act against the cast. In this way the cast has the effect of exerting a corrective force. To correct the dorsal kyphosis I consider first that 20 per cent of normal motion is in the dorsal area and 80 per cent in the lumbar area. Therefore the dorsal curve is more fixed than the lumbar curve. With the pelvis held in the normal position and the patient bending forward, the lumbar curve can be brought to any desired position. The lumbar curve could be fixed in the normal position by means of a plaster of paris cast applied with the body bending forward. Since the body will always assume the upright position, owing to the self-righting reflex (Sherrington), the natural forces of the body will act against the cast to correct the dorsal kyphosis.

A further analysis of the forces involved in such a corrective cast follows. Figure 1 shows the position and shape of the spinal column in a normal human body. The column is kept

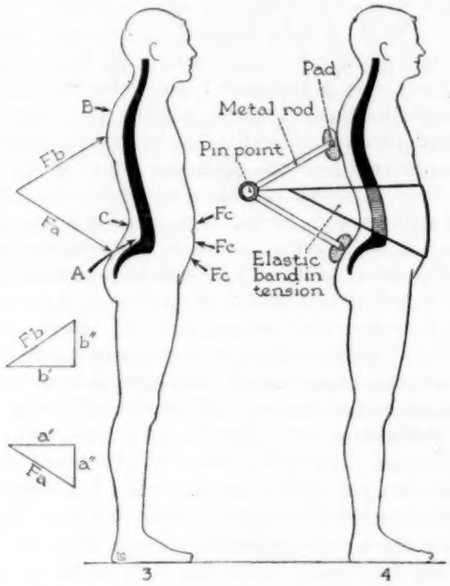

Fig. 3.—Force vectors applied to correct postural defects.
Fig. 4.—A theoretical device for correction of postural defects.

erect by the action of the muscles of the back, abdomen and chest. The action of these muscles is similar to that in a segmented tent pole which is kept erect by the action of many guy wires. If the muscles are not able to function normally, the body will sag in the direction of the curves already present. An incorrect posture, as seen in figure 2, will result. Since the lumbosacral angle has been decreased, the shearing force at this point is greater. Furthermore, the increase of the dorsal and

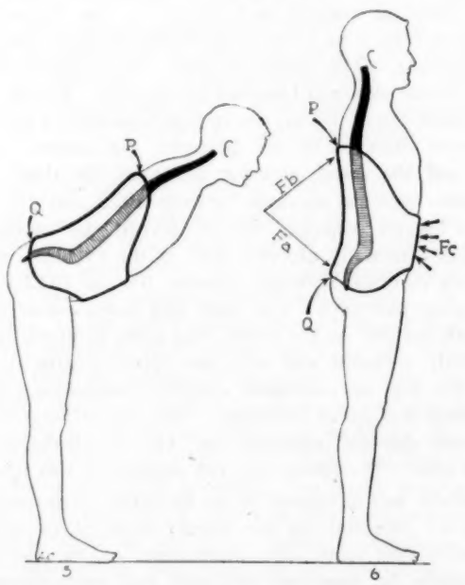

Fig. 5.—Anteroposterior curves of the spine are straightened when trunk is flexed. Plaster cast applied in this position.
Fig. 6.—Force vectors applied to correct postural defects when upright position is assumed in plaster cast.

lumbar curves results in a decrease in the height of the person. This decrease must be accompanied by more strain on the ligaments at the lumbosacral and sacroiliac joints. To correct these mechanical defects, the forces are applied as in figure 3. The

two forces *Fa* and *Fb* are concentrated in their application, while the total force *Fc*, acting on the abdomen, is distributed over a large area, and thus the pressure at any one point is not too great. For this reason the forces *Fa* and *Fb* are represented by single vectors, while the total forces in the abdomen are broken down into smaller forces over the area. All of the forces acting on the body are in equilibrium. The two forces *Fa* and *Fb* have components acting vertically away from each other, which put the spine in vertical tension and thus straighten it. The forces *Fa* and *Fc* act against each other and work toward removing the sag and reducing the shearing force. The dorsal curvature is corrected by the action of the horizontal component *Fb*. When the body assumes the upright position, the self-righting reflex acts against the force *Fb* to correct the dorsal curvature. A device which will apply the forces just described is shown in figure 4. Two rigid bars are used to apply the forces *Fa* and *Fb* respectively. To put these bars in compression, an elastic strap is applied as shown in the illustration. The strap passes over the abdomen, applying the distributed forces *Fc*. This device would apply all three forces necessary to correct the poor posture.

A practical application of this device is obtained by means of a plaster of paris cast, as seen in figure 5. With the patient bending forward and with extension on the head, curvatures of the spine are decreased. When the cast is applied to the lumbar spine and pelvis this curve becomes fixed, with the patient bending forward. When the patient stands upright (self-righting reflex), in effect the forces are applied as seen in the illustration with the elastic band device (fig. 4), with one important difference. In the elastic band device the variable force was applied by the band and the patient would have no control of the forces acting on him. In the plaster cast the patient actually applies the force on himself. After the cast is applied and the patient assumes the upright position (fig. 6) the back is longer than before. The height of the patient has been increased. Therefore when the patient is tired he will sag, but the body weight will come to rest on the top of the cast and be transmitted onto the pelvis, relieving the strain on the lumbosacral and sacroiliac joints. Thus the cast exerts forces to correct the deformity of the back and at the same time relieves the strain on the joint so that the inflammation can subside. Since the trunk is extended and the body is higher than before the application of the cast, more work is required to hold the upright position. This brings about an increase in the demand on the muscles, which acts to strengthen these structures. This increase in strength is further abetted by means of graduated exercises, alternated with periodic rests to prevent muscular strain.

The treatment is ambulatory, and relief is obtained at the same time that correction is taken. Pressure sores are not encountered.

This treatment by active cast has been applied in 2,626 cases. Excellent results were obtained in 35.6 per cent of the cases. This meant complete and permanent relief of symptoms under all circumstances. In 58 per cent of the cases the results were good. These patients were relieved of their symptoms and were satisfied but felt occasional aching or tiredness as a consequence of excessive strain. There were fair results in 3.4 per cent of the cases. These showed definite improvement but did not have complete relief of all their symptoms. Those who were not satisfied were considered poor results and composed 3 per cent of the cases.

SUMMARY

1. Low back pain is frequently due to an imbalance between the demand made on the back and the capacity of the back to do the work required of it.

2. In addition to the symptoms of low back pain, fatigue, soreness and stiffness in the back, the decompensated back has an altered posture. The normal dorsal and lumbar curves are increased.

3. The lumbosacral angle is more acute, increasing the shearing force.

4. The body sags, putting strain at the lumbosacral and sacroiliac joints, with the resulting inflammation of these joints.

5. A cast can be applied to correct the position, decrease the strain on the lumbosacral and sacroiliac joints and increase the capacity of the back.

6. A statistical study of 2,626 cases in which the corrective cast was applied showed excellent results in 35.6 per cent of the cases, good results in 58 per cent, fair results in 3.4 per cent and poor results in 3 per cent.

720 North Michigan Avenue.

Special Article

THE MEDICAL OFFICER AND FUTURE INDUSTRIAL MEDICAL PRACTICE

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Interest in the practice of industrial medicine has been constantly growing among the medical profession. Since the war started there have of necessity been certain changes, especially a curtailment of qualified personnel. For purposes of future planning it is desirable to have an estimate of the likely status of industrial health in the future.

The Committee on Postwar Medical Service made a study of the future desires of medical officers. At the time the committee devised its questionnaire, arrangements were made for the inclusion of questions concerning industrial practice. A pilot questionnaire mailed to 3,000 medical officers included a number of questions concerning industrial practice; in the response to this inquiry a small number of men indicated interest in the several fields of industrial practice. A final questionnaire was later prepared and distributed to each medical officer on active duty with the Army, Navy, Public Health Service and Veterans Administration. Owing to limitations of space and the indicated limited interest in industrial health compared to other features of general medical practice, the section on industrial practice of the questionnaire was brief.

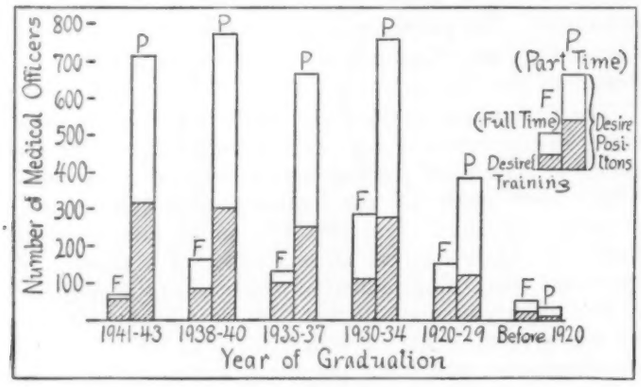
The first question asked was "Would you wish a position in industrial medical practice?" One fourth of all men, or 4,215 who returned questionnaires, indicated that they were interested in the industrial field. There were 863 men who wanted full time positions and 3,352 men who wanted part time positions. Requests for full time positions in industrial practice were scattered among the different graduation groups. For example, there were 73 requests from graduates of 1941 to 1943, 164 from graduates of 1938 to 1940, 136 from graduates of 1935 to 1937, 285 from graduates of 1930 to 1934, 153 from graduates of 1920 to 1929 and 52 from graduates of before 1920. About 80 per cent of the total, or 16,579 medical officers, definitely indicated that they were not interested in industrial practice.

Another question asked was "Would you wish special training to qualify for such a position?" Medical officers who would like to have full time positions in industrial medicine were about equally divided; there were 484, or 56 per cent, who wanted special training, and 379, or 44 per cent, who did not want special training. The greatest number of requests for special

training came from the youngest graduates. The other graduation groups were about evenly divided between those who wanted special training and those who did not. The following numbers of requests came from the several graduation groups: 59 from group 1, 88 from group 2, 99 from group 3, 118 from group 4, 95 from group 5 and 25 from group 6.

About four times as many men wanted part time positions in industrial medicine as wanted full time positions. Requests came from about the same number of men in each of the first four graduation groups. There were 716 requests from graduates of 1941 to 1943, 773 requests from graduates of 1938 to 1940, 672 requests from graduates of 1935 to 1937, 768 requests from graduates of 1930 to 1934, 388 requests from graduates of 1920 to 1929 and 35 requests from graduates of before 1920.

A little more than one third of the men who would like to engage in part time industrial medical practice would also like to take special training to qualify for positions. Nearly the same ratio of men who wanted special training to the total number in the graduation



Analysis of 21,029 returned questionnaires with respect to future desires of officers concerning industrial medical practice and training.

group was observed in each of the six graduation groups. Requests for special training came from 311 officers of group 1, 299 of group 2, 233 of group 3, 274 of group 4, 130 of group 5 and 52 of group 6.

There were 235 medical officers who were undecided about future work in industrial health, among whom 65 definitely requested further training.

Special courses in industrial health were requested by a total of 1,809 medical officers. They included men who desired full time positions in industrial medicine, men who desired part time positions in industrial medicine and men who were undecided about future positions in industrial medicine. The following number of men made requests: 381 from graduates of 1941 to 1943, 405 from graduates of 1938 to 1940, 346 from graduates of 1935 to 1937, 408 from graduates of 1930 to 1934, 231 from graduates of 1920 to 1929 and 38 from graduates of before 1920.

The questionnaire was divided into six parts: (1) general information, (2) educational, (3) industrial, (4) practice and licensure, (5) economic and (6) additional information. On the front of the questionnaire the educational portion occupied three fourths of the page, and it listed different types of training, such as internship, residency, fellowship, review courses and "other." It also listed a number of special forms of medical practice. As a result there were a number of men who entered their desire for additional training in industrial work under the educational portion of the questionnaire.[1] They naturally represented a much smaller group than those who indicated their desire for special training under the industrial section, since the questions under the latter section focused attention on the possibilities of future training and practice.

Under the educational section there were 34 requests for training in industrial medicine; of these, 21 men wanted short courses and 13 wanted long courses. There was one request for insurance training.

Short Courses.—Requests came from 3 graduates of group 2, 4 of group 3, 9 of group 4 and 5 of group 5, and most of them were for unspecified periods of training. Almost all of them had been on active military duty for two or more years.

Long Courses.—Thirteen medical officers requested training in industrial medicine and 1 in insurance work. Nearly all who wanted future training in industrial medicine were graduates before 1934 and preferred courses of six to twelve months. About half the men were in industrial practice before entering the military service; the other half were formerly in private medical practice. The request for insurance training came from a 1942 graduate who entered the Army from internship and who wanted a two year course.

Returns from the final questionnaires indicated that about 4 per cent of men in each graduation group, except group 1, wanted full time positions in industrial medicine. There were only 1.7 per cent of the medical officers in graduation group 1 who were interested in full time industrial positions. From the pilot questionnaire [2] it was shown that more than seven times as many men desired a university course of training as desired training in industry. The study also revealed that the major fields of interest were industrial surgery, insurance and plant medical department work. From this it appears that those interested in furthering sound future industrial medical practice should seek to interest younger medical officers by acquainting them with opportunities along the line of university training supplemented by in-service training in industrial plants.

Since the various aspects of industrial medical practice will be most influenced by the character and number of physicians who engage in its full time practice, encouragement of sufficient numbers of younger men in the field among whom the more capable may be selected for thorough training in its different aspects is the best assurance of meeting the objectives of good industrial medical practice in the future.

Over 16 per cent of the medical officers in each graduation group wanted part time positions in industrial medicine. While physicians engaged in part time industrial medicine render important service concerning care of patients, it is doubtful that they exert much influence on the future development of the field. Many men engaged in part time industrial practice are interested in the financial returns and view the positions as an economic security and are only secondarily concerned with future developments of sound, high grade industrial medical practice. Improved training facilities in both universities and industry and the selection of the more qualified younger men for full time positions, it is believed, will be instrumental in the development of improved industrial medical practice both for full time and for part time practitioners.

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Council on Foods and Nutrition

SPECIAL ARTICLE

This is the fourth of a series of articles discussing the significance of protein nutrition in health and disease. This material was prepared by the authors at the request of the Council and has been authorized for publication.

GEORGE K. ANDERSON, M.D., *Secretary.*

PROTEIN IN SURGERY

CHARLES C. LUND, M.D.
AND
STANLEY M. LEVENSON, M.D.
BOSTON

During the period of great expansion in surgery that followed the introduction of anesthesia and of asepsis, surgeons focused their attention on anatomy, surgical technic, pathology and bacteriology. Early it was seen that patients who could not survive complete operations might survive multiple stage operations if the first stage was a simple procedure that relieved an interference in some vital function. After such procedures a period of rest and good nutrition frequently resulted in improvement in the patient's health, so that he could survive the more serious curative operation at the second stage. Studies were not made of the optimum diets to use in the interval between operations.

Recently new methods of study and treatment of nutritional deficiencies, including protein deficiencies, have been developed. The opening article in this series, by Stare and Davidson,[1] reviews the modern knowledge of protein nutrition. The correction of protein deficiencies is of importance in shock,[2] in local [3] or general [4] hypoproteinemic edema, in wound healing,[5] in immunity to infection [6] and in detoxication of poisonous substances.[7] The methods of treatment include the use of whole blood, plasma and albumin for acute deficiencies such as hemorrhagic shock; protein hydrolysates, concentrates and diets for less acute and for chronic deficiencies.

THE CAUSES OF PROTEIN DEFICIENCY IN SURGICAL PATIENTS

The subject of nitrogen balance has been discussed previously in this series.[8] This discussion will therefore be limited to the importance of those causes of protein deficiency not including chronic dietary deficiencies, or failure of formation of protein due to liver disease, that are seen especially in surgical practice, although the surgeon must realize that the most important and frequent factor in protein deficiency is inadequate intake of food. Losses of protein may be from the intestine, through the kidneys, from any wound or orifice of the body, in internal exudates and transudates, and from any pathologic condition of the skin that causes oozing or desquamation. In general, losses from the intestine are important only in the presence of copious or long continued bleeding, diarrhea or vomiting, or due to the feeding of diets containing large amounts of roughage, and, from the urine, in the period of the increase in protein catabolism that follows injury or infection or in the nephrotic syndrome.

Coincident with the early effects of any acute trauma, poisoning, infection or even of unusual extreme exercise, a large output of nitrogen may occur in the urine that lasts for many days or even weeks. Surgical or traumatic shock does not necessarily form a part of this picture. A large part of this output of nitrogen in burns may be in the form of "undetermined" nonprotein nitrogen [9] rather than of the substances such as urea that are usually found in the urine. Satisfactory chemical characterization of the compounds excreted has not been made. Cuthbertson [10] found that nitrogen losses in the urine after fractures reached 25 Gm. per day and remained high for many days. Elman [11] found losses of similar magnitude after surgical operations. Lucido [12] and Taylor [9] found similar large losses following burns. In one of Taylor's cases there was a loss of 45 Gm. of nitrogen in one day. Browne [13] has found that a negative nitrogen balance may last up to forty-five days after some injuries. Important losses from wounds occur only in wounds of large size with large quantities of discharge such as are seen in osteomyelitis, chronic pleuropulmonary infection, other severe chronic infections or chronic bleeding. Important losses of nitrogen from the skin are commonly seen only in deep burns of large area, but in these the losses may be extreme and may continue over long periods of time. Early after superficial burns there is a large output of plasma-like fluid through the skin. This contains a high proportion of protein.[14] Later, during the sloughing stage of deeper burns there is a steady and severe loss of protein in the form of purulent material from the bed of granulations. This loss has been estimated by Taylor [15] and measured by Hirshfeld [16] and Co Tui.[17] They find that these losses may reach many grams of nitrogen per day, and the amount of loss varies directly with the area involved. These losses continue until healing is complete. Co Tui [18]

Drs. C. S. Davidson and F. H. L. Taylor made many helpful suggestions and criticisms.

From the Burn Assignment of the Surgical Services and the Thorndike Memorial Laboratory of the Boston City Hospital and the Departments of Surgery and Medicine, Harvard Medical School. The work described in this paper was done, in part, under a contract recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and Harvard University.

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has also measured similar losses in wound exudates and from tube drainage of the upper gastrointestinal tract. These losses from surfaces and wounds have not, in the past, been considered in calculating conventional nitrogen balances, and therefore it must be realized that errors of great magnitude may be introduced into such studies unless this factor is considered. A good discussion of this subject is to be found in Taylor's [15] paper.

At the same time at which large quantities of nitrogen are being lost in the urine and from wound drainage of such patients, the protein intake is likely to be greatly reduced by reason of pain, anorexia and poor or absent gastrointestinal function. The negative nitrogen balance occurring under these conditions may have serious effects in a few days [19] in the patient with already depleted body protein, and in a few weeks [15] in a patient with excellent protein nutrition.

Casten [20] has found hypoproteinemia to be associated with anesthesia. Although the studies have not been carried far enough to determine whether protein lost from the blood stream in anesthesia is excreted or merely shifted temporarily into the tissues, he found a steady reduction in the protein level in the plasma with any anesthetic agent. If the liver function was impaired preoperatively as demonstrated by a hippuric acid test, reduction of plasma proteins followed even after short operations. Further studies of this effect of anesthesia are indicated.

RESULTS OF PROTEIN DEFICIENCY ON SURGICAL PATIENTS

Hypoproteinemic edema occurs in surgical patients only when the protein depletion is extreme. However, depletions of lesser severity may cause interference with the healing of surgical wounds and burns and with gastrointestinal function before and after operations and may be an important factor in the cause of gastrointestinal, leg and decubitus ulcers. Depletion of protein also may predispose a patient to various forms of shock and reduce the resistance to infection. For these reasons the protein deficient individual is a poor operative risk.

Edema.—The first publication indicating the importance of protein nutrition in the surgical patient was that of Jones and Eaton,[4] who found that edema due to hypoproteinemia was common in patients before and after gastrointestinal surgery and that it was usually associated with a prolonged inadequate food intake. When such patients were given the then customary large quantities of saline infusions by vein postoperatively, acute pulmonary edema frequently occurred and was often fatal. They showed that this danger could at times be obviated by substituting glucose in distilled water for a large part of the glucose in saline solution that was given postoperatively. This finding has been amply confirmed by others. Jones [3] and Ravdin [21] have shown also that local edema at the site of an operation may occur in the presence of hypoproteinemia but without generalized edema. This edema may result in obstruction of the stoma of a gastrointestinal anastomosis and may, unless corrected, result fatally. Meyer and Kozoll [22] have also reported poor function of anastomoses from this cause. Minot [23] has emphasized the vicious cycle that occurs under these conditions.

Wound Healing.—Clark [24] showed that a low protein diet increased the "lag" period in the healing of experimental wounds in dogs. Harvey and Howes [25] compared the healing of experimental wounds of rats fed a standard maintenance diet which was low in protein with the healing of the same wounds of rats fed a very high protein diet. They found much more rapid healing in the rats on the latter diet and stated that this diet stimulated healing. One could also state that these experiments showed that one or more deficiencies in the low protein diet delayed normal healing. Howes and McKeown [26] studied the healing of fractures in rats in the same manner and found the same results. They also found that the bones of the rats receiving the low protein diet broke after less force was applied to them than did the bones of the rats receiving the high protein diet. It was, however, as recently as 1938 that Thompson [5] showed that human wound healing was also adversely affected by hypoproteinemia. He found a high incidence of postoperative wound disruption in hypoproteinemic patients compared to a low incidence in normal patients. Koster and Shapiro,[27] Hartzell,[28] Koster and Kasman [29] and Meyer and Kozoll [22] have confirmed this observation. Depleted protein stores have been associated with failure of skin grafts.[30] However, it should be emphasized that low protein diets imply much more than mere protein deficiency, as low protein diets are, unless special precautions are taken, usually low vitamin diets and several vitamins, particularly riboflavin, ascorbic acid and vitamin A, are growth factors and therefore associated with healing.

Gastrointestinal Function.—Jones [3] and Mecray [31] showed that hypoproteinemia prolonged the emptying time of the stomach, and Barden [32] showed impaired small intestinal function from the same cause. These findings have been confirmed by others.[22] Jones [3] and Ravdin [21] have also shown that surgical gastric stomas are particularly prone to become edematous in the presence of hypoproteinemia. When this happens, complete obstruction of the stoma may occur. Further surgery to relieve such an obstruction is dangerous and usually ineffective. Reduction of the intake of sodium has alleviated this edema promptly in some cases.[33] Theoretically, human albumin given intravenously should be useful in such an emergency.

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29. Koster, H., and Kasman, L. P.: Relation of Serum Protein to Well Healed and Disrupted Wounds, Arch. Surg. **45:** 776-784 (Nov.) 1942.
30. Levenson, S. M.; Davidson, C. S.; Lund, C. C., and Taylor F. H. L.: The Nutrition of Patients with Thermal Burns, Surg., Gynec. & Obst., to be published.
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32. Barden, R. P.; Thompson, W. D.; Ravdin, I. S., and Frank, I. L.: The Influence of the Serum Protein on the Motility of the Small Intestine, Surg., Gynec. & Obst. **66:** 819-821 (May) 1938.
33. Jones,[3] Jones and Eaton,[4] Ravdin, Stengel and Prushankin.[21]

Gastric and Duodenal Ulcers.—Three sets of experiments show that a low protein diet will always cause an ulcer in the forestomach of rats [34] and in the stomach of dogs [35] in a very few days. Jones and Eaton [4] and many others have shown that human gastroduodenal ulcers are frequently associated with hypoproteinemia. An exceedingly important observation is that of Co Tui,[36] who finds that a more striking remission of gastroduodenal ulcers follows treatment with a very high protein, high caloric diet than follows the conventional Sippy diet. All of the protein in his diet is given by mouth in the form of an enzymatic hydrolysate of casein and pancreas. He gives from 0.5 to 0.8 Gm. of nitrogen per kilogram of the patient's weight and a total of 40 to 50 calories per kilogram. The Sippy diet is quite different. In the first stage it is frequently made up of milk and cream; 39 ounces of this mixture gives only 35 Gm. of protein and 1,535 calories, of which two thirds are contributed by fat. For a 70 Kg. man the Sippy diet would furnish only one sixth the amount of protein and one half the calories that are furnished in Co Tui's minimum diet. The usual Sippy regimen later increases the protein intake to a little over double the original figure, but even after this increase neither the protein intake nor the caloric intake approaches those of Co Tui's diet.

Chronic Ulcers of the Skin.—Altschuler [37] has treated patients with skin ulceration, particularly those resulting from phlebitis or varicose veins, with protein hydrolysates. He frequently found that hypoproteinemia was present in these cases and that the ulcers healed rapidly when this was corrected. Mulholland [38] studied a large number of patients with decubitus ulcers and also found this type of ulcer to be universally associated with hypoproteinemia. Healing was rapid after an adequate protein intake was furnished.

Surgical, Traumatic, Hemorrhagic and Burn Shock.—A condition associated with hypoproteinemia is a reduced blood volume. The shock connected with surgical procedures, trauma, hemorrhage and burns is associated with reduced blood volume. Hypoproteinemic animals have been shown to be particularly susceptible to shock after any kind of injury. Whipple [39] long ago reported experimental shock from hypoproteinemia in plasmaphorized dogs. More recently Elman [40] has shown that in the presence of hypoproteinemia shock develops from very slight losses of blood and that, following such losses, a great decrease in the already low plasma protein concentration ensues.

Resistance to Infection.—Madden [41] showed that hypoproteinemic dogs were very susceptible to infection and that, once infection had developed, the regeneration of plasma protein was much more difficult. A study of the greatest importance to surgeons has recently been made by Cannon,[6] who studied the formation of antibodies in hypoproteinemic rats and found that under such circumstances their production was much reduced as compared to their production by normal rats. He gives a brief history of a patient whose plasma protein level was very low and who developed postoperative peritonitis and expresses the belief that the occurrence and outcome of various postoperative infections, including pneumonia, depend in large part on the titer of immune substances in the body, which in turn depend on the nutritional status of the patient.

Liver Damage.—It has recently been shown, in animals, that in the course of protein depletion the liver loses protein,[42] decreases in size [43] and becomes soft [44] and fatty.[45] In presence of hypoproteinemia such conditions as biliary obstruction,[46] chloroform anesthesia [47] and arsphenamine treatment [48] cause much more injury to the liver cells than they do in the well nourished patient (biliary obstruction) or well nourished animals (all three conditions). Conversely, the injured liver cannot manufacture albumin [49] or prothrombin [49] as well as the normal one. Thus it is seen that another vicious circle is encountered because the damaged liver cannot carry out its normal function of manufacturing proteins that it normally furnishes to the blood and which, in turn, protect it against damage. Although most of this work has been done on animals, it is likely that the human liver reacts in a similar fashion. However, one must remember again that the patient with hypoproteinemia may have important deficiencies other than protein which may affect the liver adversely.

FREQUENCY OF PROTEIN DEPLETION IN SURGICAL PATIENTS

1. *Prior to Operation or Injury.*—Jones and Eaton [4] found that hypoproteinemia was common among their patients with gastrointestinal disease coming to operation. Mulholland [38] has found this condition universally present in his cases of decubitus ulcers. Altschuler [37] found it commonly in ulcers of various types. Hartzell [28] found many instances in general surgical cases. Thornton [50] did not find this common in patients coming to thoracic surgery. Bartels [51] and Brown and Mecray [52] found it very common among the most severely affected group of hyperthyroid patients but less common in those

34. Hoelzel, F., and DaCosta, E.: Production of Ulcers in Prestomach of Rats by Protein Restriction, Proc. Soc. Exper. Biol. & Med. **29:** 382-384 (Jan.) 1932. Matzner, M. J.; Windwer, C., and Sobel, A. E.: The Role of Protein in the Prevention of Experimental Gastric Ulcers, Am. J. Digest. Dis. **5:** 36-38 (Jan.) 1938.

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36. Co Tui: Hyperalimentation Treatment of Peptic Ulcers with Amino Acids and Dextrimaltose, to be published.

37. Altschuler, S. S.; Saltyun, M.; Schneider, H., and Satriano, D.: Clinical Use of Amino Acids for the Maintenance of Nitrogen Equilibrium, J. A. M. A. **121:** 163-167 (Jan. 16) 1943.

38. Mulholland, J. H.; Co Tui; Wright, A. M.; Vinci Y. G., and Shafiroff, B. G. P.: Protein Metabolism and Bed Sores, Ann. Surg. **118:** 1015-1023 (Dec.) 1943.

39. Whipple, G. H.; Smith, H. P., and Belt, A. E.: Shock as a Manifestation of Tissue Injury Following Plasma Protein Depletion: The Stabilizing Value of Plasma Proteins, Am. J. Physiol. **52:** 72-100, 1920-1921.

40. Elman, R.: Acute Protein Deficiency (Hypoproteinemia) in Surgical Shock, J. A. M. A. **120:** 1176-1180 (Dec. 12) 1942.

41. Madden, S. C.; Winslow, P. M.; Howland, J. W., and Whipple, G. H.: Plasma Protein Regeneration as Influenced by Infection, Digestive Disturbances Thyroid and Food Proteins: Deficiency State Related to Protein Depletion, J. Exper. Med. **65:** 431-454 (March) 1937.

42. Elman, R., and Heifetz, C. J.: Experimental Hypoalbuminemia: Its Morphology Function and Protein and Water Content of Liver, J. Exper. Med. **73:** 417-429 (March) 1941.

43. Cannon, Wissler, Woolridge and Benditt.[6] Oelgoetz, Oelgoetz and Wittekind.[45]

44. Elman and Heifetz.[42] Oelgoetz, Oelgoetz and Wittekind.[45]

45. Oelgoetz, A. W.; Oelgoetz, P. A., and Wittekind, J.: Protein Insufficiency of Clinical Importance in Surgery on the Liver, Ohio State M. J. **33:** 643 (June) 1937.

46. Johnson, J.; Ravdin, I. S.; Vars, H. M., and Zintel, H. A.: Symposium on Preoperative and Postoperative Treatment: Effect of Diet on Composition of Liver in Presence of Obstruction of the Common Duct, Arch. Surg. **40:** 1104-1115 (June) 1940. Ravdin, I. S.; Thorogood, Elizabeth; Riegel, Celia; Peters, Rozanne, and Rhoads, J. E.: The Prevention of Liver Damage and the Facilitation of Repair of the Liver by Diet, J. A. M. A. **121:** 322-325 (Jan. 10) 1943.

47. Miller, L. L., and Whipple, G. H.: Chloroform Liver Injury Increases as Protein Stores Decrease: Studies in Nitrogen Metabolism on These Dogs, Am. J. M. Sc. **199:** 204-216 (Feb.) 1940. Miller, Ross and Whipple.[7]

48. Messinger, W. J., and Hawkins, W. B.: Arsphenamine Liver Injury Modified by Diet: Protein and Carbohydrate Protective, But Fat Injurious, Am. J. M. Sc. **199:** 216-225 (Feb.) 1940.

49. Madden, S. C., and Whipple, G. H.: Plasma Proteins, Their Source, Production and Utilization, Physiol. Rev. **20:** 194-217 (April) 1940.

50. Thornton, T. F., Jr.; Adams, W. E., and Schafer, P. W.: Hypoproteinemia in Thoracic Surgery: A Clinical Study, Surg., Gynec. & Obst. **79:** 368-373 (Oct.) 1944.

51. Bartels, E. C.: Serum Protein Studies in Hyperthyroidism, New England J. Med. **218:** 289-294 (Feb.) 1938.

52. Brown, R. B., and Mecray, P. M.: Serum Proteins Before and After Operations for Hyperthyroidism, Endocrinology **22:** 302-306 (March) 1938.

mildly affected. The group at the Memorial Hospital [53] found it common among cancer patients. In a study of 278 patients Meyer and Kozoll [22] found it frequently in association with a wide variety of surgical conditions, but in some instances the hypoproteinemia developed during acute illness or postoperatively. Evans and Boehme [54] have also found hypoproteinemia very common in general surgical patients. From these references it is seen that hypoproteinemia is to be expected frequently in a wide variety of conditions.

2. *Subsequent to Operation or Injury.*—Thornton,[50] who found essentially no hypoproteinemia prior to thoracic operations, observed that, in spite of careful replacement of the total amount of blood lost at operation, there was an average decrease of plasma protein concentration of 1 Gm. per hundred cubic centimeters in 31 of 32 patients within the first week postoperatively. Meyer and Kozoll [22] found a drop of 25 per cent of the plasma protein after operations for carcinoma of the colon and for intestinal obstruction. Ariel [55] found a greater fall in plasma protein in patients with cancer of the gastrointestinal tract than in other patients. He felt that this occurred because their protein stores were more depleted. Many groups studying burns [56] have found decreases to 3.0 to 5.0 Gm. per hundred cubic centimeters of plasma protein following severe burns even in some in whom strenuous measures to combat the fall were made. Losses of weight are frequently an indication of depleted protein stores and great losses following injury, operation and burns have been reported by Cuthbertson,[10] Hirshfeld,[16] Elman,[19] Levenson [30] and Lyons.[57]

THE EVALUATION OF PROTEIN DEFICIENCY IN SURGICAL PATIENTS

The estimation of the status of a surgical patient with regard to the presence or degree of protein deficiency is not simple. The factors necessary for a critical evaluation are (1) optimum weight of patient, (2) observed weight of patient, (3) plasma protein level, (4) plasma albumin level, (5) plasma volume, (6) nitrogen intake and (7) nitrogen output. Actually, main reliance in clinical work has to be placed on a nutritional history, on the patient's weight and on serum protein content determinations done most simply by a densitometer method. Interpretation of serum protein concentration values is often difficult. In surgical patients, particularly, one is frequently confronted by situations in which an acute disturbance has occurred in a patient with chronic protein deficiency. When this happens, the acute changes may intensify or mask the chronic ones, depending on the direction of change. A patient who has depleted body proteins and normally a low plasma protein level may by reason of vomiting become dehydrated. Plasma protein concentration may then become normal. However, as the blood volume of such a patient is increased by the administration of solutions of electrolytes or by other means, the plasma protein concentration will be found to fall to low values. Drew,[58] Seaman and Ponder [59] and Abbott and Mellors [60] have studied this problem and have shown how to make close evaluations of the true protein status of the patient in a short time by a few serial observations during treatment. Butler and Talbot [61] have reviewed the literature on the problems of parenteral fluid therapy and presented the best discussion of the evaluation of these patients.

The relative changes of albumin and globulin are also a factor of importance. In general, in acute depletions from any cause the albumin is lost faster and to a greater amount than the globulin and is built up again more slowly. A normal plasma protein value will mask a quite severe hypoalbuminemia when the globulin level is high. It must be remembered that except in acute loss the plasma proteins fall only after long continued depletion. Therefore, in cases of chronic illness the presence of a hypoproteinemia indicates a large tissue protein deficit. Elman [62] finds that a loss of 1 Gm. of albumin from the plasma represents a tissue loss of 30 Gm. of protein. Still higher ratios of plasma to tissue protein have been found.[63]

Elman [19] stresses loss of weight in evaluating protein depletion. Serial determinations of the weight of patients with burns have been found to be of great value. The weights of these patients may be secured at each dressing change by putting the patient, covered with a sterile sheet but with dressings removed, on a weighed stretcher each end of which is placed on a scale. Slight changes of weight are often the first indication that the patient's nutritional condition is getting better or worse.[64]

When a surgeon first starts to weigh his patients he may be astounded at the losses encountered. Losses of 1 to 1½ pounds (454 to 683 Gm.) a day are common after major operations, major injury, serious infection or burns when the patients receive the customary postoperative care. These losses may continue for as long as the patient is seriously ill unless special efforts are made as outlined here to prevent them. Losses of over 50 pounds (23 Kg.) in a few weeks have been reported in burns [15] and of 11 to 66 pounds (5 to 30 Kg.) after infected wounds [57] and up to 25 pounds (11 Kg.) after a relatively uncomplicated cholecystectomy.[10] Elman also finds an appreciable loss of weight after any surgical operation.[19]

THE TREATMENT OF SURGICAL PATIENTS WITH HYPOPROTEINEMIA

Chronic Conditions.—Whenever possible, protein losses or deficiencies should be corrected by oral feeding. It is not enough for the surgeon to order a "high

53. Binkley, G. E.; Abels, J. C., and Rhodes, C. P.: The Treatment of Postoperative Hypoproteinemia in Patients with Cancer of the Colon, Ann. Surg. **117:** 749-753 (May) 1943. Ariel, I. M.; Rekers, P. E.; Pack, G. T., and Rhodes, C. P.: Metabolic Studies in Patients with Cancer of the Gastrointestinal Tract: X. Hypoproteinemia and Anemia in Patients with Gastric Cancer, Ann. Surg. **118:** 366-371 (Sept.) 1943. Ariel, Abels, Pack and Rhodes.[55]

54. Evans, J. A., and Boehme, E. J.: Amino Acid Therapy in Hypoproteinemia of Surgical Patients, Surg. Clin. North America **23:** 887-895 (June) 1943.

55. Ariel, I. M.; Abels, J. C.; Pack, G. Y., and Rhodes, C. P.: Metabolic Studies in Patients with Cancer of the Gastrointestinal Tract: XI. Postoperative Hypoproteinemia and Relationship of Severe Protein Fall to Urinary Nitrogen Excretion, Surg., Gynec. & Obst. **77:** 16-20 (July) 1943.

56. Weiner, D. O.; Rowlette, A. P., and Elman, R.: Significance of Loss of Serum Protein in Therapy of Severe Burns, Proc. Soc. Exper. Biol. & Med. **34:** 484-486 (May) 1936. Clavelin and Hugonot: Generalized Edema Following Extensive Burns: Pathogenesis of Edema; Role of Serum Protein Equilibrium, Bull. et mém. Soc. méd. d. hôp. de Paris **52:** 1444-1449 (Nov. 16) 1936. Harkins, H. N., and Harmon, P. H.: Plasma Exudation: Loss of Plasma-like Fluid in Various Conditions Resembling Surgical Shock, Ann. Surg. **106:** 1070-1083 (Dec.) 1937. Harkins, H. N. L.: The Treatment of Burns, Springfield, Illinois and Baltimore, Charles C Thomas, Publisher, 1942. Taylor, Levenson, Davidson and Adams.[9] Levenson, Davidson, Lund and Taylor.[30]

57. Lyons, C.: Penicillin Therapy of Surgical Infections in the U. S. Army, J. A. M. A. **123:** 1007-1018 (Dec. 18) 1943.

58. Drew, C. R.; Scudder, J., and Pappo, J.: Controlled Fluid Therapy with Hematocrit Specific Gravity and Plasma Protein Determinations, Surg., Gynec. & Obst. **70:** 859-867 (May) 1940.

59. Seaman, B. W., and Ponder, E.: Estimation and Control of Postoperative Dehydration with Aid of Hemoglobin and Plasma Protein Determinations, J. Clin. Investigation **22:** 673-685 (Sept.) 1943.

60. Abbott, W. L., and Mellors, R. C.: Total Circulatory Plasma Proteins in Surgical Patients with Dehydration and Malnutrition, Arch. Surg. **46:** 277-288 (Feb.) 1943.

61. Butler, A. M., and Talbot, N. B.: Medical Progress: Parenteral Fluid Therapy: I. Estimation and Provision of Daily Maintenance Requirements, New England J. Med. **231:** 585-590 (Oct. 26) 1944; II.[60]

62. Elman, R.: The Practical Use of Amino Acids in Protein Nutrition, J. A. M. A., to be published.

63. Davidson, C. S., and Taylor, F. H. L.: Unpublished data.

64. Levenson, S. M.; Green, R.; Lund, C. C.; Johnson, R. E., Davidson, C. S., and Taylor, F. H. L.: Unpublished data.

protein, high caloric, high vitamin diet." If such a diet is ordered the patient may fail to benefit from the order for any one of the following reasons: 1. The diet presented to the patient is not as specified. 2. The diet presented is not eaten in whole or in part because it lacks palatability, there is lack of appetite and there is a lack of nurses to encourage eating. 3. Food eaten may be partly or wholly lost because of diarrhea or vomiting.

These difficulties have been encountered frequently in caring for patients with burns during the last two years.[65] The fact that item 1 is mentioned may be a surprise. What especially happens in these days with the shortage of nurses is that there are frequent times when supplementary feedings are not brought to the patient because the nurse has other duties to perform that she thinks are more important or more urgent. This is particularly likely to happen at night.

The three items listed under number 2 are interrelated. It is common experience to find that a sick patient has "no appetite." However, if special attention is paid to the likes and dislikes of the patient and special or other nurses are available to encourage eating and to offer meals when the patient desires them instead of only at stated routine periods, many such patients will eat a surprisingly large amount of food. A patient with severe but not desperate third degree burns had special nurses for the first two weeks and had a daily nitrogen intake of 25 Gm. with a caloric intake of 1,800. During the next eleven days, without special nurses, her nitrogen intake fell to 6 Gm. and her calories to 1,600. Later, by employing special nurses again, the nitrogen intake went up to 40 Gm. with 3,500 calories.

The two items under number 3 are also related to each other. Forcing the diet in a sick patient does not always result in a net gain. Nausea, vomiting, distention and diarrhea, singly or together, are limiting factors. In general, the sicker the patient the less fat is tolerated, and the larger the proportion of protein should be. It has been found that at least 25 per cent of the calories in the diet should come from protein and not over 15 per cent from fat if any of these intestinal symptoms have occurred recently. It is well to take a number of days to increase the food intake, as sudden increases are more likely to be followed by gastrointestinal symptoms, which can usually be avoided by more cautious increases. If this diet is not tolerated, protein in the form of a digest may be tried and frequently will be well tolerated. The available digests are not particularly palatable and should be given by intubation.

Supplementary Feeding Formulas

Type of Case	Method of Feeding	Constituents of Diet	Carbohydrate, Gm.	Protein, Gm.	Fat, Gm.	Calories, Gm.
Severe chronic burn	Oral	House diet	40	55	40	740
	Oral	Skim milk powder...100 Gm. Chocolate syrup..... 90 cc. Whole milk..... 1.0 liter	180	65	40	1,340
	Tube	Amigen, oral *.....300 Gm. Nutramigen **.....150 Gm. Water..... 3.0 liters	80	255	25	1,565
Total one day intake			300	375	105	3,645
Severe acute burn	Oral	Milk	13	9	10	130
	Oral	Ginger ale	22	0	0	90
	Oral	Egg whites ..... 14 Skim milk powder...168 Gm. Karo.....200 cc. Whole milk..... 1.6 liters	315	170	70	1,300
	Intravenous	Amigen..... 2.0 liters	100	100	0	800
Total one day intake			450	280	80	2,620
Severe acute burn	Oral	Glucose in water 20% 1.25 liters	250	0	0	1,000
	Tube	Amigen, oral.....122 Gm. Nutramigen.....340 Gm. Sugar.....244 Gm. Water.....ad 3.7 liters	622	163	63	3,700
	Intravenous	Amigen..... 20 Gm. Glucose..... 75 Gm. Water.....ad 0.5 liter	77	19	0	385
Total one day intake			950	180	63	5,085
Moderate acute burn, preexisting colitis	Oral	House diet	100	50	26	834
	Oral	Glucose in water 10% 3.5 liters	350	0	0	1,400
	Tube	Skim milk powder...150 Gm. Skim milk..... 1.5 liters	135	117	7	1,070
Total one day intake			585	167	33	3,300
Compound fracture of leg, laceration of brain, ruptured kidney	Oral	House diet	115	35	55	1,100
	Oral	Glucose in water 10% 1.4 liters	140	0	0	560
	Oral	Whole eggs..... 7 Skim milk powder... 75 Gm. Karo..... 90 cc. Chocolate syrup..... 50 cc. Whole milk.....850 cc.	190	100	75	1,840
Total one day intake			445	135	132	3,500

* Amigen (oral), an enzymatic hydrolysate of casein and pancreas.
** Nutramigen contains dextrimaltose, amigen, olive oil, starch, yeast and salts. These products were obtained from the Mead Johnson Company, Evansville, Ind.

65. Davidson and Taylor.[63] Levenson, Green, Lund, Johnson, Davidson and Taylor.[64]

Intubation feeding is important and may be used to increase the intake of food greatly. Medium caliber nasal stomach tubes are used and left in all the time or for many hours a day. If left in continuously, the tube should be removed every third or fourth day for cleaning. About 200 cc. may be given at a time, spaced between meals and at night, but there is a wide variation in the amount and frequency of supplementary tube feedings that different patients will take. It is well to start with half skim milk and half water or with a mixture of protein hydrolysate and carbohydrates. Instead of supplying the mixture in intermittent doses, a drip apparatus may be used which can, after a short period of training, be regulated by some patients themselves. If 125 to 150 Gm. of protein and 2,000 to 2,500 calories are given by intubation in addition to an average house diet, the patient should receive a total of about 200 Gm. of protein with over 4,000 calories. Usually the patients who are given "forced" supplementary feeding will not take the whole of their house diet in addition. It is difficult to get the intake above this level unless intravenous supplements are given. As some patients need 300 Gm. of protein a day, they should be given a diet and have both intubation and intravenous supplements. Sample day's food intakes of some patients are given in the accompanying table. It has been found necessary to vary the method of feeding from case to case and to a lesser extent from day to day.

Patients needing this type of feeding also need more than ordinary doses of vitamins. For two years it has been customary to use vitamin capsules with these diets in order to assure the patients 15,000 units of vitamin A, 1,500 units of vitamin D, 225 mg. of ascorbic acid, 9 mg. of thiamine, 6 mg. of riboflavin and 60 mg. of nicotinic acid. There is evidence that these doses may not always be sufficient.[64] In general, it can be stated that the patient sick enough to need intravenous feeding, alone or as a supplement, for over five days should have supplementary water soluble vitamins given intravenously or intramuscularly in approximately the following daily doses: vitamin C 500-1,000 mg., thiamine 20-40 mg., riboflavin 20-40 mg. and niacin 150-300 mg.

Acute Conditions.—In the presence of actual or threatened surgical shock, the treatment of hypoproteinemia should be by the intravenous route and should consist of human blood, plasma or albumin [66] or a combination of the three. The aim should be to restore the blood volume, red blood cell volume, blood plasma volume and plasma protein level to the point where the circulation is adequate. The best indication of restoration of an adequate circulation is the presence of urine output, normal in amount and of specific gravity between 1.010 and 1.025. At the same time it must not be forgotten that sodium chloride, various vitamins and other substances may be deficient and may need correction. If losses of all these substances continue, allowance must be made for these losses in the amounts given. To replace completely the losses of blood or plasma may demand transfusions of whole blood, plasma or both of up to 6 liters in twenty-four hours. However, such amounts must not be given without adequate and frequent clinical and laboratory control, as overtreatment may result in acute pulmonary edema.

As soon as shock or the imminent danger of shock is over, treatment should be shifted to other and less expensive forms of proteins. (The current price to hospitals for dried plasma is about $1 per gram. Albumin is not on the market, but its cost to the public and to the Navy cannot be much less than this if the value of the donated blood and processing costs are both considered.)

Protein feeding should be given intravenously until mouth feeding can be tolerated and should be continued as a supplement until oral feeding, with or without gavage, has been established at a sufficient level not only to maintain the patient in nutritional equilibrium but also to restore at a rapid rate all tissues that have been depleted. Up to 225 Gm. of protein equivalent have been given in twenty-four hours in the form of an acid hydrolysate of casein [67] or an enzymatic hydrolysate of casein and pancreas.[68] The suggestion of Butler and Talbot [69] for increasing the value of intravenous protein hydrolysates by adding glucose to them has been followed successfully. By adding 300 cc. of 50 per cent glucose to 1 liter containing 5 per cent enzymatic hydrolysate and 5 per cent glucose, 1,300 cc. of solution is obtained that is composed of about 4 per cent hydrolysate and 15 per cent glucose. This quantity is given into a large vein with a 20 or 21 gage needle in four hours without much danger of thrombosis of the vein. This mixture may be given three or even four times a day. The speed of administration of this mixture is limited by the glucose present, and the ratio of glucose administration should not exceed 0.8 Gm. per kilogram of body weight per hour. Administration at a faster rate will produce glycosuria and excessive diuresis. Nausea may be caused if the enzymatic hydrolysate is introduced too rapidly, and thrombosis of the vein used for the injection may occur with the acid hydrolysate. Febrile reactions have also been seen occasionally after the use of the enzymatic hydrolysate, but these are usually not serious. A start has also been made to develop solutions of pure amino acids suitable for intravenous feeding.[70] When a high intake of nitrogen in the form of amino acids or digests is furnished during the catabolic period early after injury, the high output of nitrogen may be increased. However, not all the nitrogen administered is lost [71] and patients so treated show very definite evidence of clinical improvement.[72] In cases of serious protein deficiency, this treatment not only will shorten convalescence but will actually save lives.[73] A full presentation of the use of intravenously administered protein digests and amino acids will be made in another paper in this series.

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66. Janeway, C. A.; Gibson, S. T.; Woodruff, L. M.; Heyl, J. T.; Bailey, O. T., and Newhouser, L. R.: Concentrated Human Serum Albumin, J. Clin. Investigation **23**: 465-490 (July) 1944. Richards, D. W., Jr. Clinical Use of Concentrated Human Serum Albumin in Shock and Comparison with Whole Blood and with Rapid Saline Infusion, ibid., pp. 491-505. Warren, J. V.; Stead, E. A., Jr.; Merrill, A. J., and Brannon, E. S.: Treatment of Shock with Concentrated Human Serum Albumin: A Preliminary Report, ibid., pp. 506-509. Janeway, C. A.: Clinical Use of Products of Human Plasma Fractionation: I. Albumin in Shock and Hypoproteinemia, J. A. M. A. **126**: 674-680 (Nov. 11) 1944. Heyl, J. T.; Gibson, J. G., 2d, and Janeway, C. A.: Plasma Proteins: Effect of Concentrated Solutions of Human and Bovine Serum Albumin in Blood Volume After Acute Blood Loss in Man, J. Clin. Investigation **22**: 763-773 (Nov.) 1943.

67. "Parenamine," obtained from Frederick Stearns & Co., Detroit.

68. "Amigen" for intravenous use kindly supplied by the Mead Johnson Company, Evansville, Ind. Levenson, Davidson, Lund and Taylor.[70]

69. Butler, A. M., and Talbot, N. B.: Medical Progress: Parenteral Fluid Therapy: II. The Estimation of Losses Incident to Starvation and Dehydration with Acidosis or Alkalosis and the Provision of Repair Therapy, New England J. Med. **231**: 621-628 (Nov. 2) 1944.

70. Madden, S. C.; Zeldis, L. J.; Hengerer, A. D.; Miller, L. L.; Rowe, A. P.; Turner, A. P., and Whipple, G. H.: Casein Digests Parenterally Utilized to Form Blood Plasma Protein, J. Exper. Med. **73**: 727-743 (June) 1941. Bassett, Woods, Shull and Madden.[71]

71. Bassett, S. H.; Woods, R. R.; Shull, F. W., and Madden, S. C.: Parenterally Administered Amino Acids as a Source of Protein in Man, New England J. Med. **230**: 106-108 (Jan. 27) 1944. Levenson, Green, Lund, Johnson, Davidson and Taylor.[64]

72. Elman.[13] Levenson, Green, Lund, Johnson, Davidson and Taylor.[64] Madden, Zeldis, Hengerer, Miller, Rowe, Turner and Whipple.[70]

73. Elman.[13] Taylor, Levenson, Davidson, Browder and Lund.[15] Ravdin, Stengel and Prushankin.[21]

MEDICAL LICENSURE STATISTICS FOR 1944

FORTY-THIRD ANNUAL PRESENTATION OF LICENSURE STATISTICS BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

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Statistical compilations regarding medical licensure are presented annually in the State Board Number of THE JOURNAL. In the following pages will be found the report for the year 1944, which constitutes the forty-third annual presentation. Data are included regarding (*a*) medical examining and licensing boards of the United States, the District of Columbia, the territories and possessions of the United States, (*b*) boards of examiners in the basic sciences, (*c*) the National Board of Medical Examiners and (*d*) examining boards in the medical specialties.

These computations are based on official records received throughout the year from the medical licensing boards of all the states, Alaska, Puerto Rico and the Virgin Islands, the homeopathic licensing boards of Connecticut, Delaware and Louisiana, the eighteen boards of examiners in the basic sciences in operation last year, the fifteen approved examining boards in the medical specialties and the National Board of Medical Examiners. The homeopathic and eclectic examining boards in Arkansas and the homeopathic board in Maryland did not license any one during the year.

The cooperation of the officers of these agencies in furnishing complete reports makes possible these annual compilations. The Council and THE JOURNAL express thanks and appreciation to those who have supplied these data and for other records furnished throughout the year to the office of the Council.

The tables referring to medical licensing boards include figures regarding the number of candidates examined for medical licensure in 1944, the numbers licensed and those who have secured their first medical license and therefore represent additions to the medical profession. The state boards are discussed first, followed by the basic science boards, the National Board of Medical Examiners and the specialty examining boards.

STATE BOARDS OF MEDICAL EXAMINERS

LICENSES ISSUED

All medical and basic science schools in the United States are operating under an accelerated program with the exception of the Woman's Medical College of Pennsylvania, which has an accelerated plan for the juniors and seniors only. The increase in the numbers of annual graduates is reflected in the number of licenses issued to practice medicine. During the year 1944, 9,606 licenses to practice medicine and surgery were issued by the medical examining boards of the forty-eight states, the District of Columbia, Alaska,

TABLE 1.—*Licenses Issued, 1944*

	On the Basis of		
	Examination	Reciprocity and Endorsement	Total
Alabama	22	32	54
Arizona	11	16	27
Arkansas	57	4	61
California	443	469	912
Colorado	125	15	140
Connecticut	30	72	102
Delaware	27	3	30
District of Columbia	31	41	72
Florida	76	0	76
Georgia	224	47	271
Idaho	15	2	17
Illinois	222	86	308
Indiana	126	50	176
Iowa	37	16	53
Kansas	179	16	195
Kentucky	159	29	188
Louisiana	256	13	269
Maine	13	13	26
Maryland	305	62	367
Massachusetts	162	93	255
Michigan	264	146	410
Minnesota	290	27	317
Mississippi	94	22	116
Missouri	433	61	494
Montana	4	6	10
Nebraska	167	7	174
Nevada	1	22	23
New Hampshire	9	20	29
New Jersey	104	159	263
New Mexico	0	14	14
New York	453	335	788
North Carolina	105	47	152
North Dakota	3	4	7
Ohio	728	109	837
Oklahoma	61	15	76
Oregon	15	33	48
Pennsylvania	851	47	898
Rhode Island	9	8	17
South Carolina	97	13	110
South Dakota	3	5	8
Tennessee	210	42	252
Texas	236	161	397
Utah	13	26	39
Vermont	12	14	26
Virginia	158	32	190
Washington	76	46	122
West Virginia	24	28	52
Wisconsin	74	24	98
Wyoming	0	10	10
Alaska, Puerto Rico, Virgin Islands	21	9	30
Totals	7,035	2,571	9,606

Marginal Number	SCHOOL	1 Alabama P	F	2 Arizona P	F	3 Arkansas P	F	4 California P	F	5 Colorado P	F	6 Connecticut P	F	7 Delaware P	F	8 Dist. Columbia P	F	9 Florida P	F	10 Georgia P	F	11 Idaho P	F	12 Illinois P	F	13 Indiana P	F	14 Iowa P	F	15 Kansas P	F	16 Kentucky P	F	17 Louisiana P	F	18 Maine P	F	19 Maryland P	F	20 Massachusetts P	F	21 Michigan P	F	22 Minnesota P	F	Marginal Number
	ARKANSAS																																													
1	University of Arkansas School of Medicine					114	0											0	1											1	0							1	0							1
	CALIFORNIA																																													
2	College of Medical Evangelists							65	0	2	0							3	0	1	0	1	0							1	0							0	1			1	0	2
3	Stanford University School of Medicine							93	0																																	1	0	3
4	University of California Medical School							77	0							1	0	1	0					1	0																					4
5	Univ. of Southern California School of Med.			2	0			53	2																													1	0							5
	COLORADO																																												
6	University of Colorado School of Medicine							3	0	56	0																																	1	0	6
	CONNECTICUT																																												
7	Yale University School of Medicine							2	0			1	0			1	0	1	0																			1	0			1	0			7
	DISTRICT OF COLUMBIA																																												
8	George Washington Univ. School of Med.							6	0			1	0			3	0	1	0									1	0									3	0			2	0			8
9	Georgetown University College of Medicine											3	0			2	0	2	0	0	1									1	0							1	0	1	3					9
10	Howard University College of Medicine			1	0			1	0							8	2	1	0					1	0					1	0							3	0							10
	GEORGIA																																												
11	Emory University School of Medicine	2	0															23	0	5	8	0																									11
12	University of Georgia School of Medicine															1	0	4	0	6	0	0		1	1															1	0					12
	ILLINOIS																																												
13	Loyola University School of Medicine							4	0			1	0	1	0							1	0	1	4	0	1	0	2	0											1	2					13
14	Northwestern University Medical School	1	0					9	0	1	0					2	0	3	0			1	0	4	5	0	3	0			1	0			1	0					1	0	3	0	9	0	14
15	University of Chicago, The School of Med.	1	0					3	0	1	0							1	0	3	0	1	0	1	8	0	2	0															3	0	2	0	15
16	University of Illinois College of Medicine							15	0							1	0	2	0					5	9	1	1	0							1	0					2	0			5	0	16
	INDIANA																																												
17	Indiana University School of Medicine							2	0									1	0									111	0																	17
	IOWA																																												
18	State University of Iowa College of Medicine	1	0			1	0											3	0			1	0	1	0			48	3											1	0					18
	KANSAS																																												
19	University of Kansas School of Medicine							2	0																					166	0											0	1			2	0	19
	KENTUCKY																																												
20	University of Louisville School of Medicine	1	0					4	0									1	0			1	0											76	0											2	0	20
	LOUISIANA																																												
21	Louisiana State University School of Medicine																	1	0																	79	1									21
22	Tulane Univ. of Louisiana School of Medicine	9	0	1	0			1	0									8	0																	166	3					0	1					22
	MARYLAND																																												
23	Johns Hopkins University School of Medicine											1	0			1	0	2	0																					42	0	1	1	1	0			23
24	University of Maryland School of Medicine and College of Physicians and Surgeons							2	0			1	0	1	0			1	0																					82	0	4	2					24
	MASSACHUSETTS																																												
25	Boston University School of Medicine																	2	0																											25
26	Harvard Medical School	1	0					1	0	1	0	2	0					1	0	1	0			0	1											1	0	1	0			8	0	1	0	4	0	26
27	Tufts College Medical School					1	0					1	0																											2	1					27
	MICHIGAN																																												
28	University of Michigan Medical School							2	1									3	0			1	0	2	0					1	0											0	1	9	0	3	0	28
29	Wayne University College of Medicine							2	0									0	1																							1	0	7	7	0	3	0	29
	MINNESOTA																																												
30	University of Minnesota Medical School							3	0	1	0							0	1					4	1																	1	0			125	0	30
	MISSOURI																																												
31	St. Louis University School of Medicine							11	0									1	0											2	0			1	0									1	0	31
32	Washington University School of Medicine							9	0											1	0																									32
	NEBRASKA																																												
33	Creighton University School of Medicine	1	0					21	0	4	0																	29	4	3	0			1	0											33
34	University of Nebraska College of Medicine							4	0			1	0									1	0					0	1													2	0					34
	NEW YORK																																												
35	Albany Medical College																	2	0																											35
36	Columbia Univ. Coll. of Phys. and Surgs.							2	0									4	0					1	0											1	0							1	0			36
37	Cornell University Medical College																	2	1																			3	0			1	0	2	6			37
38	Long Island College of Medicine											2	0					4	0																									1	0	38
39	New York Medical College, Flower and Fifth Avenue Hospitals							2	0									4	0																									2	0	39
40	New York University College of Medicine													1	0	1	0	3	1																					1	0					40
41	Syracuse University College of Medicine							1	0															1	0													1	0			3	0	2	0	41
42	University of Buffalo School of Medicine																	1	0																	1	0					1	0			42
43	University of Rochester School of Medicine and Dentistry							4	0			2	0					1	0					1	0													1	0	1	0	1	0	1	0	43
	NORTH CAROLINA																																												
44	Bowman Gray School of Medicine of Wake Forest College																																												44
45	Duke University School of Medicine																	3	0																							1	0	1	0	45
	OHIO																																												
46	Ohio State University College of Medicine							1	0									1	0																					1	0					46
47	University of Cincinnati College of Medicine	1	0			2	0	1	0									0	1									1	0											0	1			1	0	47
48	Western Reserve University School of Med.							1	0									2	0																											48
	OKLAHOMA																																												
49	University of Oklahoma School of Medicine							4	0	1	0							1	0																					1	0	1	0			1	0	49
	OREGON																																												
50	University of Oregon Medical School							6	0	1	0											3	0	1	0					1	0									3	0	1	0			2	0	50
	PENNSYLVANIA																																												
51	Hahnemann Med. Coll. and Hosp. of Phila.							3	0			3	0	3	0			2	0	2	0							2	0			1	0							1	0	3	1			2	0	51
52	Jefferson Medical College of Philadelphia							2	0			1	0	10	0			4	0			1	0																	1	0	1	0			1	0	52
53	Temple University School of Medicine	1	0			2	0			2	0	3	0	1	0	3	0					1	0															1	0					4	0	53
54	University of Pennsylvania School of Med.	3	0			1	0	2	0			4	0	1	0	3	0					1	0					1	0			1	0					1	0	1	0	2	0	1	0	2	0	54
55	University of Pittsburgh School of Medicine																	2	0																							1	0					55
56	Woman's Medical College of Pennsylvania					1	1													2	0																					1	0					56
	SOUTH CAROLINA																																												
57	Medical Coll. of the State of South Carolina																	1	0					1	0																					57
	TENNESSEE																																												
58	Meharry Medical College															2	0	2	0																	2	0									58
59	University of Tennessee College of Medicine	2	0					1	0							1	0	4	0					1	0							1	0							2	2			4	0	59
60	Vanderbilt University School of Medicine							1	0									2	1																					1	1					60
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	

P—Passed; F—Failed.

Marginal Number	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U. S. Terr. & Possessions	Totals	Examined—Passed	Examined—Failed	Percentage—Failed	No. Boards Examined by	Marginal Number
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						
	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
1									3 1																1 0				122	120	2	1.6	6	1
2		1 0 1 0										1 0							2 0	1 0			2 0 6 0					1 0	90	89	1	1.1	16	2
3					0 1																1 0			1 0					97	96	1	1.0	5	3
4									3 1							1 0												1 0	86	85	1	1.2	7	4
5												1 0																	59	57	2	3.4	4	5
6		1 0																						1 0					62	62	0	0.0	5	6
7									2 0																				9	9	0	0.0	7	7
8	2 0						1 0								2 0					1 0				1 0	2 0			1 0	27	27	0	0.0	14	8
9							1 0		3 6	1 0					13 1	2 0				1 0			6 0		1 0			1 0	50	39	11	22.0	16	9
10		6 0					1 0		3 4	2 0		1 0			2 0								1 0						38	32	6	15.8	14	10
11										2 0																			85	85	0	0.0	4	11
12									1 0																				69	68	1	1.4	6	12
13		1 0					5 0		2 3			2 0			3 0									1 0					44	39	5	11.4	14	13
14	2 0 1 0					1 0 1 0				2 0 1 0		5 0			4 0			1 0	1 0		3 0			7 0		2 0			111	111	0	0.0	26	14
15									4 0			2 0 1 0			4 0									1 0	2 0				49	49	0	0.0	16	15
16		1 0							3 1			1 0		0 1						1 0				1 0		1 0			97	94	3	3.1	15	16
17																													114	114	0	0.0	3	17
18		1 0												1 0		1 0													62	59	3	4.8	10	18
19									1 0															1 0					173	172	1	0.6	6	19
20	2 0														2 0									2 0 1 0				1 0	93	93	0	0.0	11	20
21	2 0								1 0																			2 0	86	85	1	1.2	5	21
22	21 0								0 1						1 0				1 0										213	208	5	2.3	10	22
23	1 0								1 0 1 0						2 0					1 0									55	54	1	1.8	11	23
24										1 0					10 0									1 0				3 0	108	106	2	1.9	10	24
25															1 0														3	3	0	0.0	2	25
26		3 0							4 1	4 0		1 0			4 0	1 0	1 0			2 0				1 0					45	43	2	4.4	21	26
27						2 0			1 1							1 0													10	8	2	20.0	6	27
28									3 0	1 0					2 0					1 0				1 0				1 0	113	111	2	1.8	14	28
29																													84	83	1	1.2	5	29
30									1 0					1 0						1 0						2 0			141	139	2	1.4	10	30
31		91 0					2 0		5 6		1 0				4 0								1 0			1 0		1 0	128	122	6	4.7	13	31
32	1 0 92 0														1 0					2 0								1 0	107	107	0	0.0	7	32
33		1 0		7 0			1 0		1 4					1 2									2 0		2 0			84	74	10	11.9	13	33
34				74 6					1 0												1 0		2 0						93	86	7	7.5	9	34
35																								1 0					3	3	0	0.0	2	35
36							1 0		10 0						1 0									2 0					23	23	0	0.0	9	36
37		1 0					2 0		23 1	1 0		2 0			1 0	2 0							1 0	1 0		1 0			45	43	2	4.4	14	37
38							6 0		35 5						1 1														55	49	6	10.9	6	38
39							1 0		0 1																				10	9	1	10.0	5	39
40						1 0	9 0		45 9	2 0					6 0	1 0								1 0				1 0	82	72	10	12.2	12	40
41									15 2						1 0													1 0	27	25	2	7.5	8	41
42									3 0						1 0														7	7	0	0.0	5	42
43							1 0		6 2	1 0		2 0								1 0									25	23	2	8.0	13	43
44										40 0		1 0																	41	41	0	0.0	2	44
45										23 0									1 0										30	30	0	0.0	6	45
46									2 0			70 0																	75	75	0	0.0	5	46
47									6 1			71 0			1 0														87	84	3	3.4	10	47
48									4 3			72 0			3 0									1 0					86	83	3	3.5	6	48
49													70 0																79	79	0	0.0	7	49
50									1 0			1 0		8 1							1 0		23 0		2 0				55	54	1	1.8	14	50
51	1 0						9 0		5 6			10 0			119 10	2 2							1 0	2 0				2 0	192	173	19	9.9	19	51
52	3 0					1 0	6 0		2 2	14 0		3 0			185 3	1 0	1 0			1 0			1 0	2 0					247	242	5	2.0	21	52
53							6 0		2 2	1 0					136 2					2 0	4 0			3 0	3 0				179	175	4	2.2	17	53
54	1 0						3 0		6 1	7 0		2 0			162 0		1 0			1 0			1 0	4 0	3 0	1 0		1 0	217	216	1	0.5	26	54
55									1 0			1 0			146 2								1 0						154	152	2	1.3	6	55
56		2 0										1 0			8 0													2 0	18	17	1	5.6	7	56
57																	48 1								1 0				52	51	1	1.9	4	57
58									1 0						2 0			101 0											110	110	0	0.0	6	58
59	17 0 1 0												1 0					83 0		2 0									122	120	2	1.6	13	59
60					1 0				2 0						1 0			48 0											58	56	2	3.4	7	60
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						

Marginal Number	SCHOOL	1 Alabama P	F	2 Arizona P	F	3 Arkansas P	F	4 California P	F	5 Colorado P	F	6 Connecticut P	F	7 Delaware P	F	8 Dist. Columbia P	F	9 Florida P	F	10 Georgia P	F	11 Idaho P	F	12 Illinois P	F	13 Indiana P	F	14 Iowa P	F	15 Kansas P	F	16 Kentucky P	F	17 Louisiana P	F	18 Maine P	F	19 Maryland P	F	20 Massachusetts P	F	21 Michigan P	F	22 Minnesota P	F	Marginal Number
	TEXAS																																											
61	Baylor University College of Medicine							1	0																																1	0	61
62	Southwestern Medical College of the Southwestern Medical Foundation																																										62
63	University of Texas School of Medicine																																								1	0	63
	UTAH																																										
64	University of Utah School of Medicine																																										64
	VERMONT																																										
65	University of Vermont College of Medicine																																										65
	VIRGINIA																																										
66	Medical College of Virginia																	3	0																						3	0	66
67	University of Virginia Department of Medicine																	1	0																								67
	WISCONSIN																																										
68	Marquette University School of Medicine							5	1									0	1					1	0													1	0			3	0	68
69	University of Wisconsin Medical School							4	0			1	0					1	0					1	0							1	0							2	0	2	0	69
	CANADA																																										
70	Dalhousie University Faculty of Medicine																																										70
71	Laval University Faculty of Medicine											1	1																														71
72	McGill University Faculty of Medicine	1	0					5	1																													1	1				72
73	Queen's University Faculty of Medicine																																										73
74	University of Alberta Faculty of Medicine							1	0															1	0																	1	0	74
75	University of Manitoba Faculty of Medicine	1	0																																								75
76	University of Montreal Faculty of Medicine							0	1			0	1																									1	1				76
77	University of Toronto Faculty of Medicine							3	0			1	0	1	0			2	1							1	0														2	0	77
78	University of Western Ontario Medical School											1	0					1	0																								78
	OTHERS																																										
79	Foreign Medical Faculties	1	0					9	7	1	0	3	7											13	16			1	0					1	0	4	2	9	3	6	31			79
80	Extinct Medical Schools																	5	0			2	0	2	0															1	1			4	0	80
81	Unapproved Schools and an Undergraduate									7	3	5	9	3	0									45	5	3	0													106	211				81
82	Totals	20		11		115		472		82		52		27		28		139		126		15		243		126		90		179		78		250		16		155		423		189		197	
83	Totals—Examined—Passed	20		11		115		458		79		34		27		26		130		125		15		218		126		82		179		78		255		13		151		162		189		197	
84	Totals—Examined—Failed	0		0		0		14		3		18		0		2		9		1		0		25		0		8		0		0		4		3		4		261		0		0	
85	Percentage Failed	0.0		0.0		0.0		3.0		3.7		34.6		0.0		7.1		6.5		0.8		0.0		10.3		0.0		8.9		0.0		0.0		1.5		18.7		2.6		61.7		0.0		0.0	
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22	

P—Passed; F—Failed.

Puerto Rico and the Virgin Islands, as shown in table 1. Of the 9,606 licenses issued, 7,035 were issued after examination and 2,571 by reciprocity and endorsement of other state licenses or the certificate of the National Board of Medical Examiners.

It does not follow that all physicians certified in a given year after examination were tested in that year. In twenty-three states, the District of Columbia, Alaska, Canal Zone, Hawaii and Puerto Rico the internship is a requisite for practice, but in some of them a physician is permitted to take an examination before completion of the internship and, if successful, the license is withheld until completion of the internship. Licenses are also withheld in some states for proof of citizenship and other technicalities. In others the licenses of those examined in December are dated and issued in the following year. The statistics in table 1, therefore, include many who were examined in 1943 and even a few in previous years. Consequently, figures in this table will not correspond with those hereinafter given, which deal entirely with physicians examined for licensure within the year 1944.

The greatest number of licenses during the calendar year 1944 were issued in California, 912. Three other states licensed more than 700: Pennsylvania 898, Ohio 837 and New York 788. Twenty-two states, the District of Columbia and the territories and possessions licensed fewer than 100. None were licensed by examination in Wyoming. The fewest, 7, were licensed in North Dakota.

While the great majority of physicians was licensed after examination and represents in the main physicians who obtained their medical license on completion of the medical course and before their entry on active duty with the armed forces, there were 2,571 registered without examination—by reciprocity agreements or by the endorsement of credentials. Seventeen states licensed more physicians by reciprocity or endorsement than by examination. Florida, Idaho, Massachusetts and Rhode Island have no reciprocal agreements, but with the exception of Florida these states endorse diplomates of the National Board of Medical Examiners.

Increases in the number of physicians registered last year as compared with data reported for the year 1943 were noticeable in a number of states and particularly in California, Georgia, Maryland, Michigan, Missouri, Ohio and Pennsylvania. On the other hand, decreases were significant in some states. These variances are attributable to some extent to the accelerated program of the medical schools and the graduation of two classes of students by some schools in one year. In New York there was again a reduction in foreign graduates examined for licensure.

Thirty were registered in the territories and possessions as follows: by examination Alaska 3 and Puerto Rico 18; by endorsement Alaska 3, Puerto Rico 2 and the Virgin Islands 4.

Totals for nine previous years and for 1944 by all methods of licensure are shown for comparison in table 3. The high figures for the years from 1936 to 1941 in the annual number of licenses issued were due to the licensure of foreign graduates. In 1944 there was an increase of 1,211 over the number registered in the previous year. Acceleration started in most medical schools in the United States on July 1, 1942.

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						
	Virginia Summer	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U.S. Terr. & Possessions	Totals	Examined—Passed	Examined—Failed	Percentage—Failed	No. Boards Examined by	Marginal Number
	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F					
61									1 0						1 0					29 0										33	33	0	0.0	5	61
62	1 0																			117 0										118	118	0	0.0	2	62
63															1 0					97 0										99	99	0	0.0	3	63
64																					19 0									19	19	0	0.0	1	64
65																						7 0								7	7	0	0.0	1	65
66	3 0								2 0	2 0					2 0								68 3		2 0					88	85	3	3.4	8	66
67									0 1						1 0								67 4							74	69	5	6.8	4	67
68									4 1						5 0					1 0				5 0		38 0				66	63	3	4.5	10	68
69		1 0							0 1			1 0			2 0								1 0	1 0	1 0	22 0				42	41	1	2.4	15	69
70									0 1																					1	0	1	100.0	1	70
71							1 0		1 2																					6	3	3	50.0	3	71
72						1 0			4 2						1 0								1 0	3 0						21	17	4	19.0	8	72
73									1 0							1 0														2	2	0	0.0	2	73
74																														3	3	0	0.0	3	74
75																														1	1	0	0.0	1	75
76						0 2			1 1																1 0					9	3	6	66.7	6	76
77									1 1						1 0															14	12	2	14.3	8	77
78									1 1																					4	3	1	25.0	3	78
79	2 0	4 0					16 10		224 286			4 0			9 1	0 1		2 0		4 1			2 1	3 0				7 0		691	325	366	53.0	22	79
80							1 0		2 1		1 0	2 0			1 0									1 0				1 0		25	23	2	8.0	12	80
81	1 0			0 5		3 1	30 1					72 25		0 1						38 2			5 1							582	318	264	45.4	14	81
82	60	207	3	92	1	13	115	0	816	105	3	354	72	16	873	16	52	3	237	306	30	7	167	75	24	74	0	28	6,791					82
83	60	207	3	81	1	9	104	0	454	105	3	329	72	11	853	13	51	3	237	303	30	7	158	75	24	74	0	28	5,985					83
84	0	0	0	11	0	4	11	0	362	0	0	25	0	5	20	3	1	0	0	3	0	0	9	0	0	0	0	0	806					84
85	0.0	0.0	0.0	12.0	0.0	30.8	9.6	0.0	44.4	0.0	0.0	7.1	0.0	31.3	2.3	18.7	1.9	0.0	0.0	1.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0				11.9		85
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50						

The total graduates for the four-session three-year cycle to July 1, 1945 is estimated at 20,201. For the three years 1942, 1943 and 1944, 26,611 physicians received licenses. While this figure includes physicians previously licensed who are migrating to other states, it is believed that by the completion of the accelerated medical school cycle in June 1945 the great majority of recent graduates probably will have been licensed prior to entry on active duty with the armed forces.

TABLE 3.—*Licenses Issued, 1935-1944*

	Examination	Reciprocity and Endorsement	Total
1935	5,725	2,194	7,919
1936	6,275	2,772	9,047
1937	6,629	3,204	9,833
1938	6,557	2,956	9,513
1939	6,400	2,872	9,272
1940	6,289	2,866	9,155
1941	6,053	2,759	8,812
1942	6,141	2,469	8,610
1943	6,059	2,336	8,395
1944	7,035	2,571	9,606
Totals	63,163	26,999	90,162

In the past ten year period 90,162 medical licenses have been issued, 63,163 after examination and 26,999 by endorsement of credentials.

The figures given do not altogether represent individuals but include persons who may have been licensed in more than one state during a given year; nor does the total represent additions to the medical profession, since a physician may be licensed by examination in a nonreciprocating state. Among those licensed by reciprocity or endorsement are some who received licenses by endorsement of the certificate of the National Board of Medical Examiners but may not have been previously licensed. In tables 11, 12 and 13 can be noted the number who secured licenses for the first time and represent additions to the medical profession in the United States and its territories and possessions.

CANDIDATES EXAMINED BY MEDICAL EXAMINING BOARDS

In table 2 are recorded figures referring to those examined for medical licensure by individual states, the District of Columbia, Alaska and Puerto Rico, indicating the numbers who passed and failed in each state and the medical school of graduation. Throughout the year 6,791 were examined, of whom 5,985 passed and 806 failed. Candidates represented sixty-nine approved medical schools in the United States, nine approved medical schools of Canada, ninety-two faculties of medicine and two licensing corporations of other countries, seven medical schools now extinct, six unapproved institutions and seven colleges of osteopathy and 1 individual who had not completed the medical course. Osteopaths who were granted the privilege to practice medicine, surgery or both by the medical examining boards are included in these statistics. Osteopaths in other states who obtain the legal right to special practice by the osteopathic board are excluded from these compilations.

Examination schedules have been adjusted to coincide as nearly as possible with the graduating dates of the medical schools located within their states. Executive officers and members of examining boards are to be commended for adding this work to their already overtaxed responsibilities.

The 6,791 examinees represented 5,432 graduates of approved medical schools in the United States, of whom 2.9 per cent failed; 61 graduates of approved Canadian schools, 27.9 per cent failures; 25 who graduated from approved medical schools no longer operating with 8.0 per cent failures; 691 graduates of faculties of medicine located in countries other than the United States and Canada, 53.0 per cent of whom failed, and 582 graduates of unapproved institutions with 45.4 per cent failures. The number of examinees in each of these categories was considerably less in 1944 than in the previous year. In 1944 there were 1,002 fewer examinees among graduates of approved medical schools, 10 fewer Canadian graduates, 76 fewer graduates of schools now extinct, 340 fewer graduates of foreign faculties of medicine and 175 fewer from unapproved institutions. This decrease may be ascribed primarily to the accelerated program and the graduation of two classes by medical schools in 1943, by most approved institutions. Most of these graduates were examined in the year of graduation and appear in the statistics on candidates examined as published in the 1944 State Board Number. However, large numbers of those examined late in 1943 were not actually licensed until 1944. Such physicians were mainly responsible for the 1944 increase in licenses issued, discussed earlier in connection with table 1.

TABLE 4.—*Graduates of Medical Schools in Canada Examined for Licensure in the United States, 1944*

	Examined	Passed	Failed
Alabama	2	2	0
California	11	9	2
Connecticut	5	3	2
Delaware	1	1	0
Florida	4	3	1
Illinois	1	1	0
Indiana	1	1	0
Maine	2	1	1
Maryland	2	1	1
Minnesota	3	3	0
New Hampshire	3	1	2
New Jersey	1	1	0
New York	17	9	8
Pennsylvania	2	2	0
Rhode Island	1	1	0
Virginia	1	1	0
Washington	3	3	0
West Virginia	1	1	0
Totals	61	44	17

The closing of Rush Medical College several years ago necessitated the placing of graduates of this school among the extinct medical schools. The majority of physicians recorded in the classification of extinct medical schools were graduates of Rush. In 1944 there were far fewer graduates of this school examined than in 1943. For several years the number of graduates of foreign faculties of medicine has been decreasing. Table 27, page 122, contains totals for this category of examinees from 1930 to 1944. There were 175 fewer graduates of unapproved institutions examined. Considerable reductions occurred in Massachusetts and Ohio.

This decrease is not seen in the tables showing licenses issued in 1944 because the licenses of many who were examined in 1943 were issued and dated in 1944, since many schools graduated their second class of 1943 late in the year.

As in table 1, the 6,791 physicians and others examined for medical licensure do not represent an equal number of individuals, since a candidate might take an examination in more than one state and is counted in each state. However, if a candidate fails more than once in a given state within the year he is counted in that state as only one failure.

The greatest number of graduates of any one school examined was 247 representing Jefferson Medical College. This school had one graduating class in 1943 and two in 1944, in January and September. Licenses were earned by these persons in twenty-one states. Five of the examinees failed. More than 200 graduates of two other schools applied for licenses by examination last year, namely Tulane University 213 and the University of Pennsylvania 217. These high figures also represent two graduating classes. However, a small percentage are graduates of other years. Figures published in 1943 [1] revealed that in the year 1942 there were examined 4,609 graduates of 1940, 1941 and 1942 from approved medical schools in the United States. In that year the total number of graduates examined from sixty-five approved medical schools in the United States was 4,905. The percentage of failures of recent graduates in 1942 was 1.9 and of all graduates of these schools 2.4. In the calendar year 1944, while no compilation of recent graduates has been made, 2.9 per cent of the 5,432 graduates of the approved medical schools in the United States failed.

Twenty-three approved schools in the United States had no failures before medical licensing boards, thirty-two less than 5 per cent and six between 5 and 10 per cent. There were eight schools with 10 per cent or more failures in state examinations. These figures and percentages are modified by data on those who were examined by the National Board of Medical Examiners in its final examination as well as those passing state tests (see table 6).

Nineteen graduates of the newly developed four year medical school at the University of Utah School of Medicine, which graduated its first class in 1944, were tested for medical licensure in the state of Utah, and all were successful. This school was formerly a school of the basic medical sciences. It earned approval as a four year medical school by the Council on Medical Education and Hospitals in 1944.

Graduates of Northwestern University and the University of Pennsylvania were examined in the greatest number of states—twenty-six. Harvard and Jefferson alumni were tested in twenty-one states. All other schools had their graduates examined in fewer than twenty states. The medical schools of Indiana, Boston University, Albany, Bowman Gray, Southwestern, Texas, Utah and Vermont had graduates examined in fewer than four states. Only 3 graduates of Boston University and Albany Medical College took a state written examination.

TABLE 5.—*Source of Candidates Examined, 1944*

Medical Schools	Number of Schools	Number Examined	Number Passed	Number Failed	Percentage Failed
Approved, in United States	69	5,432	5,275	157	2.9
Approved, in Canada	9	61	44	17	27.9
Extinct	7	25	23	2	8.0
Foreign	94	691	325	366	53.0
Unapproved Schools	13	582	318	264	45.4
Totals	192	6,791	5,985	806	11.9

Graduates of the Southwestern Medical College appeared for the first time in medical licensure statistics. This new school was developed at Dallas, Texas, in 1943 and has to date had two graduating classes, in March and December 1944. There were 118 graduates tested in two states (Mississippi 1 and Texas 117)

1. J. A. M. A. **122**: 95 (May 8) 1943.

with no failures. This medical school is approved by the Council on Medical Education and Hospitals.

Three of the five homeopathic boards in existence examined 7 candidates: Connecticut 3, Delaware 3 and Louisiana 1. The homeopathic boards in Arkansas and Maryland did not examine any one in 1944. The one eclectic board in existence in Arkansas likewise did not examine a candidate.

Sixty-one graduates of nine approved medical schools in Canada applied for medical registration in eighteen states (table 4), of whom 44 passed and 17 failed. The greatest numbers represented McGill University (21) and the University of Toronto (14). Graduates of each of those two schools were examined in eight states. Normally larger numbers of graduates of these schools secure licensure in this country. In 1942 the figures were 60 for McGill and 45 for Toronto.[2] In 1943 they decreased to 23 and 19 respectively. This reduction in graduates from McGill and Toronto seeking licensure in the United States is probably related to the war.

Three Canadian schools had no failures before United States licensing boards, while the other six schools had percentages higher than 14. The highest percentage of failures was 66.7, from 9 graduates of the University of Montreal examined in six states. The state of New York examined 17 Canadian graduates and California 11. All other states examined fewer than 6.

The 582 graduates of unapproved and osteopathic schools represented 346 graduates of unapproved medical schools, of whom 153 passed and 193 (55.8 per cent) failed, and 236 graduates of schools of osteopathy, of whom 165 passed and 71 (30.1 per cent) failed. Included among unapproved graduates is 1 candidate who had not completed the medical course. He was passed in Mississippi.

Graduates of osteopathic schools were examined by the medical boards of eleven states, namely Colorado, Connecticut, Delaware, Indiana, Massachusetts, Nebraska, New Hampshire, New Jersey, Ohio, Oregon and Texas, while graduates of unapproved medical schools were examined in three states—Illinois, Massachusetts and Virginia.

Graduates of medical schools of other countries were examined in twenty-one states and Puerto Rico.

The source of candidates for licensure last year on the basis of examination is further analyzed in table 5, giving totals for five groups, namely approved medical schools in the United States and those from Canada, schools no longer in existence, schools of foreign countries and unapproved schools. As already mentioned, from the United States schools 2.9 per cent failed as did 27.9 per cent of the graduates of Canadian schools. The greatest percentage of failures represented two groups, foreign schools and unapproved schools. In these two groups, 53.0 and 45.4 per cent respectively failed. From the extinct medical schools 8.0 per cent failed.

Elsewhere (see table 11, page 113) are given figures referring to actual licentiates and additions to the medical profession.

CONSOLIDATED EXAMINATIONS

In the calendar year 1944, 5,432 graduates of approved medical schools in the United States were examined by medical licensing boards, of whom 2.9 per cent failed (table 6). In the same period 1,135 graduates of approved medical schools in the United States

2. J. A. M. A. **122**: 93 (May 8) 1943.

TABLE 6.—*Consolidated Examinations, State Medical Examining Boards and the National Board of Medical Examiners, 1944*

School	Part III Results by Medical Examining Board Tests		Part III Examination of National Board of Medical Examiners		Total Examined	Totals		
	P	F	P	F		P	F	%F
University of **Arkansas**....	120	2	1	0	123	121	2	1.6
Coll. of Med. Evan. **(Calif.)**	89	1	31	0	121	120	1	0.8
Stanford University.....	96	1	1	0	98	97	1	1.0
Univ. of California.....	85	1	1	0	87	86	1	1.1
Univ. of Southern California	57	2	1	0	60	58	2	3.3
Univ. of **Colorado**.....	62	0	1	0	63	63	0	0.0
Yale Univ. **(Connecticut)**..	9	0	47	2	58	56	2	3.4
Geo. Washington Univ. **(D.C.)**	27	0	45	0	72	72	0	0.0
Georgetown University.....	39	11	22	1	73	61	12	16.4
Howard University.....	32	6	..	..	38	32	6	15.8
Emory Univ. **(Georgia)**....	85	0	..	..	85	85	0	0.0
University of Georgia.....	68	1	..	..	69	68	1	1.4
Loyola Univ. **(Illinois)**....	39	5	1	0	45	40	5	11.1
Northwestern University...	111	0	8	0	119	119	0	0.0
University of Chicago.....	49	0	5	0	54	54	0	0.0
University of Illinois.....	94	3	3	1	101	97	4	4.0
Indiana University.....	114	0	..	..	114	114	0	0.0
State University of **Iowa**...	59	3	18	0	80	77	3	3.7
University of **Kansas**.....	172	1	..	..	173	172	1	0.6
Univ. of Louisville **(Ky.)**..	93	0	7	0	100	100	0	0.0
Louisiana State University.	85	1	1	0	87	86	1	1.1
Tulane University.....	208	5	..	..	213	208	5	2.3
Johns Hopkins Univ. **(Md.)**	54	1	11	0	66	65	1	1.5
University of Maryland....	106	2	3	1	112	109	3	2.7
Boston Univ. **(Mass.)**.....	3	0	50	0	53	53	0	0.0
Harvard Medical School...	43	2	92	0	137	135	2	1.5
Tufts College Med. School..	8	2	65	0	75	73	2	2.7
University of **Michigan**....	111	2	5	0	118	116	2	1.7
Wayne University.....	83	1	..	..	84	83	1	1.2
University of **Minnesota**...	139	2	4	0	145	143	2	1.4
St. Louis Univ. **(Missouri)**	122	6	6	0	134	128	6	4.5
Washington University.....	107	0	10	0	117	117	0	0.0
Creighton Univ. **(Nebraska)**	74	10	5	1	90	79	11	12.2
University of Nebraska....	86	7	1	0	94	87	7	7.4
Albany Med. Coll. **(N. Y.)**	3	0	47	2	52	50	2	3.8
Columbia University.....	23	0	66	0	89	89	0	0.0
Cornell University.....	43	2	42	0	87	85	2	2.3
Long Island Coll. of Med.	49	6	32	0	87	81	6	7.0
New York Medical College	9	1	106	5	121	115	6	5.0
New York University.....	72	10	83	1	166	155	11	6.6
Syracuse University.....	25	2	19	1	47	44	3	6.4
University of Buffalo.....	7	0	109	3	119	116	3	2.5
University of Rochester....	23	2	28	0	53	51	2	3.8
Bowman-Gray School of Med. **(North Carolina)**...	41	0	1	0	42	42	0	0.0
Duke University.....	30	0	56	1	87	86	1	1.1
Ohio State University.....	75	0	..	..	75	75	0	0.0
University of Cincinnati...	84	3	6	0	93	90	3	3.2
Western Reserve University	83	3	1	0	87	84	3	3.4
University of **Oklahoma**...	79	0	..	..	79	79	0	0.0
University of **Oregon**.....	54	1	3	0	58	57	1	1.7
Hahnemann, Phila. **(Pa.)**..	173	19	4	0	196	177	19	9.7
Jefferson Medical College..	242	5	3	1	251	245	6	2.4
Temple University.....	175	4	9	0	188	184	4	2.1
University of Pennsylvania.	216	1	14	0	231	230	1	0.4
University of Pittsburgh...	152	2	..	..	154	152	2	1.3
Woman's Med., Pa.....	17	1	8	1	27	25	2	7.5
Med. Coll. of **South Carolina**	51	1	..	..	52	51	1	1.9
Meharry Med. Coll. **(Tenn.)**	110	0	3	0	113	113	0	0.0
University of Tennessee...	120	2	..	..	122	120	2	1.6
Vanderbilt University.....	56	2	..	..	58	56	2	3.4
Baylor University **(Texas)**.	33	0	1	0	34	34	0	0.0
Southwestern Medical Coll.	118	0	..	..	118	118	0	0.0
University of Texas.....	99	0	..	..	99	99	0	0.0
University of **Utah**.....	19	0	..	..	19	19	0	0.0
University of **Vermont**.....	7	0	22	0	29	29	0	0.0
Med. Coll. of **Virginia**.....	85	3	2	0	90	87	3	3.3
University of Virginia.....	69	5	2	0	76	71	5	6.6
Marquette Univ. **(Wisconsin)**	63	3	2	0	68	65	3	4.4
University of Wisconsin...	41	1	..	..	42	41	1	2.4
Totals: U. S. Schools...	5,275	157	1,114	21	6,567	6,389	178	2.7
Dalhousie Univ. **(N. S.)**...	0	1	..	..	1	0	1	100.0
Laval Univ. **(Quebec)**.....	3	3	..	..	6	3	3	50.0
McGill University.....	17	4	7	0	28	24	4	14.3
Queen's Univ. **(Ontario)**...	2	0	..	..	2	2	0	0.0
University of **Alberta**.....	3	0	..	..	3	3	0	0.0
University of **Manitoba**....	1	0	..	..	1	1	0	0.0
Univ. of Montreal **(Quebec)**	3	6	..	..	9	3	6	66.7
Univ. of Toronto **(Ontario)**	12	2	2	0	16	14	2	12.5
Univ. of Western Ontario..	3	1	1	0	5	4	1	20.0
Totals: Canadian Schools	44	17	10	0	71	54	17	23.9
Extinct Medical Schools...	23	2	1	0	26	24	2	7.7
Unapproved Schools.....	318	264	..	..	582	318	264	45.4
Foreign Medical Faculties..	325	366	20	0	711	345	366	51.5
Totals	5,985	806	1,145	21	7,957	7,130	827	10.4

were tested in part III of the examination of the National Board of Medical Examiners, of whom 1.8 per cent failed. A comparison of the failures in each group revealed that in some instances schools having a high percentage of failures before licensing boards had few, if any, failures before the National Board of Medical Examiners. In these consolidated figures for 6,567 graduates, the percentage of failures of approved medical schools in the United States was 2.7.

Of the Canadian graduates, 27.9 per cent failed state board tests and 23.9 per cent the combined tests. Ten graduates of three Canadian schools were examined by the National Board of Medical Examiners and all passed. Only 20 graduates of foreign faculties of medicine were admitted to the National Board's final examination while 691 were examined by state licensing boards. The National Board of Medical Examiners does not admit to its examinations the graduates of unapproved medical schools in the United States.

The total of all examined before medical licensing boards was 6,791, of whom 5,985 passed and 806, 11.9 per cent, failed. For both groups—state boards and the National Board—7,957 were examined; 7,130 passed and 827, or 10.4 per cent, failed. Fifty-two existing and one extinct approved medical school in the United States were represented in the National Board's examinations. Twelve of these schools had graduates examined in each group with no failures in either. These schools were Colorado, George Washington, Northwestern, Chicago, Louisville, Boston, Washington, Columbia, Bowman Gray, Meharry, Baylor and Vermont.

Four schools had failures above 10 per cent in the combined statistics: Georgetown 16.4 per cent, Howard 15.8 per cent, Creighton 12.2 per cent and Loyola 11.1 per cent.

FAILURES

Data recorded in table 7 refer to failures before medical licensing boards by licentiates of 1944. In presenting these statistics the United States is divided into two groups—the thirty-one states in which approved four year medical schools are located and those, including Alaska and Puerto Rico, which have no approved medical school within their boundaries. Included is the number who failed state board examinations and were graduates of a medical school located in the state in which they were examined and, for comparison, the number of graduates licensed in a given state who obtained their professional training in schools in other states.

Two of the three approved medical schools of Massachusetts had only one failure last year in the state, while 25.4 per cent of those who obtained their medical education in thirty-four other approved schools failed. In New York 2.8 per cent of those who studied medicine in eight of the nine schools located in that state who appeared for licensure in 1944 had previously failed, and 23.4 per cent who obtained their medical training in thirty-six schools located in other states failed. Sixty-five physicians failed examinations in the state in which the medical school they attended was located, and nineteen states had no failures from schools within their boundaries. In no instance was the percentage of failures greater in the case of graduates of schools located within the state of licensure.

Practically all states require the applicant to receive a general average of 75 per cent and 50 per cent in any one subject. In case of failure in not more than two subjects the applicant is entitled to another examination in those subjects within twelve months. A few states consider such individuals as conditioned in the subjects in which they fail and do not report them to the Council as failures. In these instances they are not considered in the calculations in this study. When their grades are raised after a successful test in the subjects in which they failed they are recorded among those who passed.

In eighteen states having no medical school only three reported failures, namely Florida, New Hampshire and Rhode Island. Fifty-one schools were represented at Florida examinations with 6.2 per cent failures. In New Hampshire with five schools represented 16.7 per cent failed, while in Rhode Island nine schools were represented with 14.3 per cent failures.

TABLE 7.—*Licensure Failures by Graduates of Approved Schools Located in the State Where Examined and Elsewhere, 1944*

	Total No. Examined	No. Failures of Schools in State	No. Schools in State Represented at Examinations	Per Cent Failed	No. Failures of Schools Out of State	No. Schools Out of State Represented at Examinations	Per Cent Failed	Total per Cent Failed in All U. S. Schools
Arkansas	215	0	1	0.0	0	1	0.0	0.0
California	445	2	4	0.4	3	41	0.7	1.1
Colorado	71	0	1	0.0	0	10	0.0	0.0
Connecticut	23	0	1	0.0	0	14	0.0	0.0
Dist. of Columbia	28	2	3	7.1	0	11	0.0	7.1
Georgia	126	0	2	0.0	1	5	0.8	0.8
Illinois	161	1	4	0.6	3	17	1.9	2.5
Indiana	122	0	1	0.0	0	8	0.0	0.0
Iowa	89	3	1	3.4	5	5	5.6	9.0
Kansas	179	0	1	0.0	0	10	0.0	0.0
Kentucky	77	0	1	0.0	0	2	0.0	0.0
Louisiana	258	4	2	1.6	0	8	0.0	1.6
Maryland	141	0	2	0.0	0	11	0.0	0.0
Massachusetts	67	1	2	1.5	17	34	25.4	26.9
Michigan	189	0	2	0.0	0	12	0.0	0.0
Minnesota	190	0	1	0.0	0	29	0.0	0.0
Missouri	203	0	2	0.0	0	12	0.0	0.0
Nebraska	87	6	2	6.9	0	0	0.0	6.9
New York	286	20	8	2.8	59	36	12.6	23.4
North Carolina	105	0	2	0.0	0	15	0.0	0.0
Ohio	251	0	3	0.0	0	18	0.0	0.0
Oklahoma	72	0	1	0.0	0	2	0.0	0.0
Oregon	15	1	1	6.7	3	4	20.0	26.7
Pennsylvania	860	17	6	2.0	2	31	0.2	2.2
South Carolina	52	1	1	1.9	0	3	0.0	1.9
Tennessee	237	0	3	0.0	0	4	0.0	0.0
Texas	261	0	3	0.0	0	14	0.0	0.0
Utah	30	0	1	0.0	0	6	0.0	0.0
Vermont	7	0	1	0.0	0	0	0.0	0.0
Virginia	157	7	2	4.5	0	9	0.0	4.5
Wisconsin	74	0	2	0.0	0	9	0.0	0.0
Subtotals	4,978	65	67	1.3	93	381	1.9	3.1
States Without Medical Schools								
Alabama	17				0	5	0.0	0.0
Arizona	11				0	10	0.0	0.0
Delaware	23				0	7	0.0	0.0
Florida	130				8	51	6.2	6.2
Idaho	13				0	11	0.0	0.0
Maine	8				0	6	0.0	0.0
Mississippi	57				0	13	0.0	0.0
Montana	3				0	3	0.0	0.0
Nevada	1				0	1	0.0	0.0
New Hampshire	6				1	5	16.7	16.7
New Jersey	56				0	17	0.0	0.0
New Mexico	0				0	0	0.0	0.0
North Dakota	2				0	2	0.0	0.0
Rhode Island	14				2	9	14.3	14.3
South Dakota	1				0	1	0.0	0.0
Washington	68				0	23	0.0	0.0
West Virginia	24				0	14	0.0	0.0
Wyoming	0				0	0	0.0	0.0
Alaska and Puerto Rico	20				0	15	0.0	0.0
Subtotals	454				11	193	2.4	2.4

The total number examined in the first group—states in which approved four year medical schools are located—was 4,978, while in the second group—states which have no approved medical school within their boundaries—454 were examined.

In another table dealing exclusively with failures (table 8) the data are further subdivided by the number of candidates who were licensed after previous failure. The figures are presented for three groups,

namely graduates of approved medical schools, foreign faculties of medicine and unapproved institutions. These groups are classified according to the number licensed after failing a state board examination once and after two or more failures and indicates whether the single failures have been in the state of licensure or elsewhere; the table also indicates whether multiple failures have been in the state where licensed and/or elsewhere. The total number of candidates examined and licensed, or granted licenses without written examination—by reciprocity or endorsement—in each state, and the total number of failures in all groups is shown.

In the computation of these statistics it was noted that 58 graduates of foreign faculties of medicine failed five or more times before licensure, likewise 4 graduates of unapproved institutions failed at least five times. A graduate of one approved school made 7 unsuccessful attempts before obtaining licensure. Of the foreign graduates 16 had five failures before obtaining a license, 14 failed six examinations, 6 failed seven, 8 eight, 6 nine, 3 ten, 1 each eleven and twelve, 2 thirteen and 1 failed eighteen tests.

TABLE 8.—*Failures Before Medical Licensing Boards by Licentiates, 1944*

	Licenses Issued by Examination, Reciprocity or Endorsement	Approved Schools					Foreign Schools					Unapproved Schools					Total Failures by Licentiates, 1944
		Licensed After One Failure		Licensed After Two or More Failures			Licensed After One Failure		Licensed After Two or More Failures			Licensed After One Failure		Licensed After Two or More Failures			
		Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed	Elsewhere	Failed in State Where Licensed and Elsewhere	
Alabama	54	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1
Arizona	27	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Arkansas	61	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
California	912	7	3	1	..	..	2	3	1	..	1	1	..	..	..	..	19
Colorado	140	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2
Connecticut	102	..	3	..	..	..	..	..	..	4	..	..	..	..	..	..	7
Delaware	30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
District of Columbia	72	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	3
Florida	76	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Georgia	271	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Idaho	17	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Illinois	308	8	..	1	..	..	3	1	3	1	3	2	..	..	..	1	23
Indiana	176	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Iowa	53	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Kansas	195	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Kentucky	188	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Louisiana	269	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Maine	26	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	3
Maryland	367	..	..	..	1	..	..	1	..	1	2	..	..	..	..	..	5
Massachusetts	255	3	..	..	..	..	2	..	..	..	..	18	..	27	..	..	50
Michigan	410	..	1	..	2	..	..	..	..	..	1	..	..	..	..	..	4
Minnesota	317	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Mississippi	116	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	3
Missouri	494	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Montana	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Nebraska	174	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Nevada	23	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
New Hampshire	29	..	..	..	..	..	..	..	..	1	1	1	..	..	1	..	4
New Jersey	263	1	2	..	1	1	..	7	4	19	6	1	..	..	2	..	44
New Mexico	14	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
New York	788	17	..	8	..	1	38	4	112	3	16	..	..	2	..	..	199
North Carolina	152	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
North Dakota	7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Ohio	837	..	1	..	..	..	..	..	2	1	..	9	..	1	..	..	13
Oklahoma	76	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Oregon	48	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
Pennsylvania	898	1	2	..	..	..	..	..	2	..	2	..	1	..	..	..	8
Rhode Island	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
South Carolina	110	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
South Dakota	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Tennessee	252	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Texas	397	..	3	..	1	..	1	..	..	..	1	2	..	1	..	..	9
Utah	39	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Vermont	26	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Virginia	190	..	..	..	..	..	1	..	..	..	..	..	..	..	2	..	3
Washington	122	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1
West Virginia	52	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1
Wisconsin	98	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Wyoming	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Alaska Puerto Rico and Virgin Islands	30	..	2	..	..	..	..	..	..	2	..	..	..	..	..	..	4
Totals	9,606	44	29	10	6	3	47	16	124	37	35	36	1	28	6	1	423

Of the 9,606 licensed in 1944, 423 had previously been unsuccessful before a licensing board. From the approved schools, 92 of those licensed had previously failed a state board examination. Forty-four failed once before being licensed in a given state and 29 after one failure elsewhere. Nineteen received licenses after more than one failure, 10 of whom were registered in the original state, 6 elsewhere; 3 failed in the state where licensed and elsewhere.

The graduates of foreign faculties of medicine who were registered after previous failures numbered 259 and those of unapproved schools 72.

The 4 graduates of unapproved institutions failed as follows: five tests, 2; six tests, 1; and 1 of the graduates failed eleven attempts. The majority of these physicians with multiple failures were Massachusetts and New York examinees.

In twenty-one states all physicians licensed last year had no failure in a state medical examination before being registered. There were 2,461 such individuals. With the exception of California, Illinois, Massachusetts, New Jersey, New York and Ohio the number of physicians licensed throughout the country in each state after previously having failed was less than 10.

REGISTRATION BY RECIPROCITY AND ENDORSEMENT

A summary of the reciprocity and endorsement policies of the various states, the District of Columbia, Alaska, Hawaii and Puerto Rico will be found in table 9. Four states—Florida, Idaho, Massachusetts and Rhode Island, as well as Hawaii—have not established reciprocal agreements with regard to medical licensure. Of these four all except Florida will register diplomates of the National Board of Medical Examiners by endorsement, as will also Hawaii. Those desiring licenses by reciprocity or endorsement in seventeen states and the District of Columbia are required to obtain a certificate from the state board of examiners in the basic sciences before being eligible for licensure.

Reciprocal relationships in medical licensure have been established in forty-four states, the District of Columbia, Alaska and Puerto Rico. Twenty-five of these states, Alaska and Puerto Rico reciprocate with specifically indicated states. Twenty-five states, including six which have specific reciprocity agreements, are given discretionary powers under the medical practice act. These states will register physicians who present

TABLE 9.—*Reciprocity*

Marginal Number	The Examining Board of	Reciprocates with, or Endorses Certificates Granted by: Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	Marginal Number
1	Alabama	..	..	+	+	+	..	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	..	+	+	1
2	Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
3	Arkansas (regular board)	+	+	..	+	+	..	..	+	..	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	+	+	3
4	California	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4
5	Colorado	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
6	Connecticut (reg. & homeo. bds.)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7	Delaware (regular board)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8	District of Columbia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8
9	Florida	No reciprocity or endorsement policies											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	Georgia	+	..	+	+	+	..	..	+	..	..	..	..	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	10
11	Idaho	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
12	Illinois	+	..	+	+	+	..	..	..	..	..	..	..	+	+	+	+	+	+	+	..	+	..	+	+	..	+	+	..	+	..	12
13	Indiana	+	..	+	+	+	..	..	+	..	+	..	+[32]	..	+	+	+	+	+	+	..	+	..	+	+	..	+	+	+	+	+	13
14	Iowa	+	..	+	+	+	..	+	+	..	+	..	+	+	..	+	+	+	+	+	..	+	..	+	+	..	+	+	+	+	+	14
15	Kansas	+	+	+[19]	+	..	..	+	+	..	+	..	+	+	+	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	15
16	Kentucky	+	..	+	+	+	..	+	+	..	+	..	+	+	+	+	..	+	..	+	..	+	+	+	..	+	+	+	+	+	+	16
17	Louisiana (reg. & homeo. bds.)	+	+	+	+	+	..	+	+	..	+	..	+	+	+	+	+	..	+	+	..	+	+	+	+	..	+	+	+	+	+	17
18	Maine	..	..	+	+	+	..	+	+	..	+	..	+	+	+	+	+	+	..	+	..	+	+	..	+	+	+	+	..	+	+	18
19	Maryland (reg. & homeo. bds.)	+	..	+	[4]	..	..	+	+	..	+	..	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	19
20	Massachusetts	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20
21	Michigan	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	21
22	Minnesota	+	..	+	+	..	..	+	..	..	+	..	..	..	+	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	22
23	Mississippi	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	23
24	Missouri	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	24
25	Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	25
26	Nebraska	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	26
27	Nevada	..	..	+[21]	+	+	..	..	..	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	..	+	+	..	+	..	..	27
28	New Hampshire	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28
29	New Jersey	+	..	..	+	+	..	..	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	..	..	..	..	+	..	+	..	..	29
30	New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	30
31	New York	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	31
32	North Carolina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
33	North Dakota	+	..	+	+	+	..	..	..	..	+	..	+	+	+	+	+	+	..	+	..	+	..	+	+	+	+	+	+	+	+	33
34	Ohio	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	34
35	Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
36	Oregon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	36
37	Pennsylvania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37
38	Rhode Island	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	38
39	South Carolina	+	..	..	..	..	..	..	+	..	+	..	..	..	..	+	+	+	+	+	..	+	..	..	..	..	..	..	..	+	+	..	39
40	South Dakota	+	+	+	+	+	..	..	..	..	+	..	..	+	+	+	+	+	..	..	..	+	+	+	..	+	+	..	+	..	..	+	40
41	Tennessee	+	+	+	+	+	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	..	+	+	+	+	41
42	Texas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	42
43	Utah	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	43
44	Vermont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	44
45	Virginia	+	..	+	+	..	..	+	+	..	+	..	..	+	+	+	+	+	+	+	..	+	+	+	..	+	..	..	+	+	+	45
46	Washington	+	..	..	+	+	..	..	..	..	+	..	..	..	+	..	+	+	..	+	..	+	+	+	+	+	+	..	..	..	..	..	46
47	West Virginia	+	..	+	..	..	..	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	..	+	..	47
48	Wisconsin	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	48
49	Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49
50	Alaska	+	..	+	+	+	..	+	..	..	..	..	+	..	+	+	..	+	..	..	..	+	+	..	+	..	..	+	+	+	..	50
51	Hawaii	No reciprocal relations											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51
52	Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52

This summary should be supplemented by direct communication with the

Some states have additional requirements for graduates of schools outside the United States and Canada.

+, indicates reciprocal or endorsement relationships have been established; .. indicates no reciprocal or endorsement relationships have been established. (See column—"At the discretion of the board").

1. 1st P, first papers required; ⊕, in citizenship column indicates full citizenship required.
2. In most cases there is a small additional recording or registration fee.
3. If state of original license grants similar privileges.
4. Internship accepted in lieu of one year's practice.
5. Professional practice required.
6. No professional practice required.
7. Just preceding application.
8. No basic science reciprocity—examination must be within the state.
9. Basic science certificate required either by reciprocity or examination in addition to basic science subjects of National Board.
10. Reserve officers not eligible.
11. Leading medical schools of Great Britain recognized.
12. Oral examination required when original license is ten or more years old.
13. Applicant must have resided in the state used as basis or application for one year after date on said certificate.
14. Oral examination required.
15. Unless in practice in another state for five years.
16. Actual practice for a period of three years immediately preceding date of application.
17. Practical, clinical examination required.
18. Foreign graduates only.
19. Regular and Homeopathic boards.
20. Licentiates of Florida, Idaho, Massachusetts, Rhode Island and Hawaii not eligible for license by reciprocity.
21. Regular board.
22. Fee same as applicant's state charges if more than $50.
23. Oral examination required if applicant's state requires it.
24. If an applicant passes the examination in the state from which he transfers after the completion of his internship, no practice is required.

credentials which correspond with those required by their respective states at the time such licenses were issued. The states in which diplomates of the National Board of Medical Examiners and medical officers of the government services are accepted for licensure on the basis of these credentials are also indicated.

citizenship requirement. This is indicated in footnotes. Few states will accept graduates of foreign faculties of medicine on a reciprocal basis. Additional requisites or exemptions are included in footnotes.

This chart will be available in reprint form. It has proved to be of material assistance to those physi-

and Endorsement Policies

Marginal Number	Reciprocates with, or Endorses Certificates Granted by: New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Puerto Rico	At the Discretion of the Board	National Board of Medical Examiners	U. S. Government Services	Requirements: Basic Science Certificate	Internship	Professional Practice	Citizenship [1]	Fees, Dollars [2]	Miscellaneous	Marginal Number
1	+	+	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	+	+	..	+[3]	+	+	..	⊕	1[4]	⊕[45]	50	..	1
2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+[6,8]	⊕[8]	..	3[4,7]	..	100	42	2
3	+	+	+	+	+	..	+	..	+	+	+	+	..	+	+	+	+	+	+	+	..	..	+[9]	..	⊕	..	1[4]	⊕	50[22]	42	3
4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[12]	+[12,43]	+[10,14]	..	4[1]	1[13]	..	100	43	4
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[9]	10	⊕	..	1[4]	1st P	50	42	5
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14,30]	+[14,27]	..	⊕[15]	..	3[16]	1st P	50	..	6
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[5]	+	..	⊕	2	⊕	100	..	7
8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[8]	+[27]	+[5]	⊕	⊕	1	..	50	..	8
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	..	..	..	..	+	..	..	..	0	⊕	50	..	10
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	..	⊕	..	⊕	50	..	11
12	..	..	+	+	+	+	+	..	..	..	+	+	+	+	+	..	+	+	+	+	..	..	+[17]	+[10,17]	..	⊕	1	1st P	25	37,42	12
13	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	..	+	+	+	..	..	..	+[49]	..	..	..	1[4]	..	50	..	13
14	..	+	+	+	+	..	+	..	..	+	+	..	+	..	+	+	+	+	+	..	..	..	+	..	⊕	⊕	1[4]	⊕[45]	50	..	14
15	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	..	+	+	+	+	..	..	+	..	..	..	1[4,7]	⊕	25	42	15
16	..	..	..	+	+	..	+	..	+	+	+	+	+	+	+	+	+	+	..	..	..	..	+	+	..	..	1[4]	⊕	50	42	16
17	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	..	..	..	..	..	..	..	[33]	1[4]	1st P[40,46]	50	42	17
18	..	..	+	+	+	+	+	..	+	..	+	+	+	+	+	..	+	+	+	..	..	..	+[14]	..	..	⊕[18]	1[4]	⊕[45]	52	..	18
19	+	+	..	+	+	+	+	..	+	..	+	+	..	+	+	..	+	+	..	+	..	+	+	..	..	..	1[4]	1st P	50	42	19
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	0	1st P	25	..	20
21	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+[38]	..	⊕[37]	⊕	1[4]	⊕	55	34	21
22	..	+	..	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	⊕	..	0	⊕[45]	75	37,42	22
23	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	..	..	..	..	⊕[45]	50	42,44	23
24	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[47]	..	..	⊕[33]	1[4]	⊕[45]	50	..	24
25	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	⊕	1[4]	⊕	75	45	25
26	+	+	+	..	+	+	+	..	+	..	+	+	+	+	+	+	+	+	..	+	..	..	+[36]	..	⊕	..	1[4]	⊕	50	..	26
27	+	..	..	+	+	+	+	..	..	+	+	..	+	+	..	..	+	+	..	+	..	..	+	..	..	⊕	1[4]	1st P	100	14,42	27
28	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..	⊕	0	⊕[45]	20	42	28
29	+	..	+	+	+	..	+	..	..	..	..	+	+	+	+	..	+	+	..	..	..	+	+	..	..	⊕	0	⊕	100	..	29
30	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	⊕	..	1[4]	1st P	50	42	30
31	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	..	2	1st P	25	..	31
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..	..	0	⊕	50	42,50	32
33	..	+	..	+	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	..	..	+	..	..	⊕	1	⊕	50[22]	14,42	33
34	..	+	+	..	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	..	..	1[4]	⊕	50	23	34
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	..	1[4]	⊕	100	42,44,50	35
36	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[20]	+[9,27]	..	⊕	⊕	1[4]	..	100	42,50	36
37	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..	⊕	2[24]	1st P	100	42	37
38	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	⊕	⊕	0	1st P	20	..	38
39	..	+	..	+	+	..	+	..	..	..	+	+	..	..	+	..	+	..	+	..	..	..	+	..	..	..	1[4]	⊕	50	42	39
40	..	+	+	+	+	+	..	..	+	..	+	+	+	+	+	+	+	+	+	..	..	..	+	+	⊕	⊕	1	1st P	50	42	40
41	+	+	..	+	+	..	+	..	+	+	..	+	+	..	+	+	+	+	+	..	..	..	+[30]	+	⊕	..	0	..	10	42	41
42	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	+	..	..	1[25]	⊕	50	31	42
43	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	+	..	⊕	4[8]	⊕	50	42	43
44	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[8]	+[35]	..	..	⊕	0	⊕	50	..	44
45	+	+	..	+	+	..	+	..	+	+	+	+	..	+	..	+	+	+	+	..	..	+	+	+	..	⊕[18]	2[26]	⊕[45]	50	..	45
46	..	..	..	+	+	+	+	..	..	+	+	+	+	+	+	..	..	+	..	+	..	..	+[8]	..	⊕[8]	⊕	0	1st P	25	42	46
47	..	+	+	+	+	..	+	..	+	+	+	+	+	+	+	..	..	+[28]	+	+	..	..	+	..	..	⊕	0	⊕	100	42	47
48	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	+	⊕	⊕	1[29]	1st P	50[22]	42	48
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	+[14]	+	..	⊕	0	⊕	50	..	49
50	..	+	+	+	+	+	..	..	..	..	+	+	+	+	+	+	+	+	..	..	..	..	+	..	..	⊕	0	⊕	100	50	50
51	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	..	..	⊕	..	⊕	25	11,42,50	51
52	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[39]	..	⊕	0	⊕	25	..	52

secretary of the licensing board of the state in which the physician is interested.

25. Internship accepted if served in this state.
26. Internship accepted—considered equivalent to two years' practice.
27. Fee $25.
28. Conditionally.
29. A two year internship is accepted.
30. Diplomates of National Board not required to have been in practice for three years.
31. Graduates before 1907 required to take oral examination.
32. Clinical examination required.
33. Reciprocity applicants only.
34. Supplemental examination required in certain cases when accepting the examination of a state with whom reciprocal relations have not been established.
35. May be licensed after a special (written) supplemental examination.
36. Fee for license on basis of National Board certificate, $50.
37. For matriculants after Oct. 15, 1937.
38. Fee, $20.
39. While on active duty only.
40. Permanent license withheld until completion of citizenship.
41. Graduates of foreign medical schools effective Sept. 15, 1935. Canadian schools exempted effective Sept. 19, 1939.
42. Graduates of foreign medical school are not accepted.
43. Graduates of foreign medical schools must have fulfilled all requirements of California prior to admittance to examination for any certificate used as basis of application to California.
44. Graduates of approved schools of Canada eligible.
45. Not applicable to citizens of Canada.
46. Canadian citizens are required to file first papers.
47. Fee, $15.
48. Same as required of Utah candidates applying for licensure.
49. Diplomates are accepted on basis of reexamination. The question and answer manuscripts from the National Board are submitted for regrading.
50. All applicants must be graduates of a medical school approved by the American Medical Association.

Specific requirements, such as professional practice, oral examination and internship, are recorded, as is also the fee for a license without written examination. Citizenship prequisites are mentioned. In some states physicians of Canadian birth are exempt from the

cians who are contemplating locating in another state.

The facts recorded in this table are intended to be merely general statements of licensure policies. A physician using this chart for reciprocity purposes should supplement the information contained therein by direct

TABLE 10.—*Candidates Licensed by Reciprocity and Endorsement, 1944*

Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
State Issuing License by Reciprocity or Endorsement	**Total Licensed**	**Alabama**	**Arizona**	**Arkansas**	**California**	**Colorado**	**Connecticut**	**Delaware**	**District of Columbia**	**Florida**	**Georgia**	**Idaho**	**Illinois**	**Indiana**	**Iowa**	**Kansas**	**Kentucky**	**Louisiana**	**Maine**	**Maryland**	**Massachusetts**	**Michigan**	**Minnesota**	**Mississippi**	**Missouri**	**Montana**	**Nebraska**	**Nevada**	**New Hampshire**	**New Jersey**	**New Mexico**	**New York**	**North Carolina**	**North Dakota**	**Ohio**	**Oklahoma**	**Oregon**	**Pennsylvania**	**Rhode Island**	**South Carolina**	**South Dakota**	**Tennessee**	**Texas**	**Utah**	**Vermont**	**Virginia**	**Washington**	**West Virginia**	**Wisconsin**	**Wyoming**	**U. S. Govt. Service**	**National Board of Medical Examiners**	**U. S. Terr. and Possessions**	**Canadian & Foreign**	**Miscellaneous**
Alabama	32	..	..	..	..	..	..	..	..	..	1	..	4	..	..	..	..	3	..	..	..	1	..	4	2	..	..	..	..	..	1	..	..	..	..	..	1	..	1	..	9	..	..	..	3	..	..	..	..	..	2	..	..	..
Arizona	16	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	1	1	..	..	..	2	..	..	..	..	2	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	3	..	1	..
Arkansas	4	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
California	469	2	1	3	..	6	1	..	1	2	..	1	76	13	14	8	5	12	..	8	4	18	19	..	12	1	16	..	..	2	..	61	1	..	28	4	3	20	2	1	..	11	12	3	..	4	17	1	9	1	8	56	2	..	..
Colorado	15	..	..	1	..	..	..	..	..	..	..	..	..	1	1	1	..	2	..	..	..	..	..	..	3	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	3	..	..	..
Connecticut	72	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	1	2	2	..	..	..	1	..	..	..	1	1	..	24	..	..	3	..	1	1	..	..	..	1	..	2	..	..	..	..	..	..	29	..	..	..
Delaware	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dist. Columbia	41	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	1	..	4	1	..	..	..	..	3	..	..	..	..	..	..	..	7	..	..	..	..	..	19	..	..	..
Florida	0	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Georgia	47	..	..	1	..	..	..	..	..	1	..	..	..	..	2	1	1	..	..	4	..	1	..	2	..	..	3	..	..	1	..	4	..	..	1	..	..	2	..	2	..	10	1	..	..	2	..	..	..	..	8	..	..	..
Idaho	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..
Illinois	86	..	..	2	4	..	..	..	..	..	..	..	..	3	4	..	1	..	..	..	..	10	1	..	13	..	4	..	..	2	..	..	..	..	5	..	..	3	..	..	..	4	..	..	..	1	..	1	10	..	..	18	..	..	..
Indiana	47	..	..	1	..	..	1	..	..	..	1	..	10	..	2	..	6	1	..	..	..	5	..	..	3	..	..	..	..	..	..	5	..	..	2	..	..	1	..	..	..	2	..	..	..	1	..	2	..	..	..	4	..	..	..
Iowa	16	..	..	..	..	..	..	..	..	..	..	..	5	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	1	..	..	..	..	..	..	..	..	..	5	..	..	..
Kansas	16	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	1	..	..	6	..	2	..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..
Kentucky	29	..	..	2	..	..	..	..	..	..	1	..	1	2	..	..	..	1	..	..	..	2	..	1	..	2	..	1	..	..	..	2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Louisiana	13	1	1	1	..	..	..	..	..	..	1	..	1	..	1	..	..	..	..	..	..	1	1	..	1	..	1	..	..	..	..	2	..	..	2	..	..	1	..	1	..	8	..	..	..	1	..	1	..	..	1	1	..	..	..
Maine	13	..	..	..	1	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	1	1	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..
Maryland	62	..	..	..	1	..	..	..	14	..	2	..	1	..	1	..	..	..	..	1	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..
Massachusetts	93	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	2	..	6	1	..	2	1	..	7	..	..	..	6	2	..	..	..	1	1	..	..	..	12	..	..	..
Michigan	146	..	..	4	4	1	..	..	..	..	3	..	16	3	3	1	1	1	2	4	..	..	9	..	13	..	10	..	..	1	..	4	2	..	17	2	1	9	..	..	1	7	3	1	..	3	..	2	4	..	..	14	..	..	..
Minnesota	27	2	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	2	..	3	..	..	..	..	1	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	2	..	..	11	..	..	..
Mississippi	22	..	..	1	..	..	..	..	..	..	2	..	2	..	..	..	..	5	..	1	..	2	..	..	1	..	..	..	..	..	..	2	..	..	1	..	..	2	..	..	..	..	..	..	..	..	1	..	2	..	..	2	..	..	..
Missouri	61	..	..	3	4	1	..	..	1	..	..	..	3	..	4	7	..	..	..	1	1	1	..	1	..	..	3	..	..	..	..	4	1	..	2	1	..	..	..	..	..	5	1	..	..	..	..	3	3	..	..	11	..	..	..
Montana	6	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..
Nebraska	7	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nevada	22	..	..	..	3	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
New Hampshire	18	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	1	..	..	..	..	1	1	..	..	3	..	..	..	..	4	..	..	2	..	..	2	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..
New Jersey	159	..	1	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	..	1	2	1	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	..	..	..
New Mexico	14	..	..	1	..	2	..	..	1	..	..	..	4	..	2	..	1	3	1	9	..	..	..	..	2	..	..	..	..	..	..	75	1	..	2	..	..	15	1	..	..	5	..	..	..	4	..	1	..	..	..	30	..	..	..
New York	335	..	..	..	7	..	..	1	..	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	2	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..	..
North Carolina	47	1	..	..	1	..	..	..	1	..	3	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	13	..	..	..	1	..	6	4	..	2	..	..	..	259	1	1	1
North Dakota	4	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	3	1	1	..	..	2	..	..	..	..	..	..	2	..	..	1	..	..	3	..	1	..	6	..	..	..	5	..	2	..	..	..	13	..	..	..
Ohio	106	..	..	2	2	..	1	..	..	..	..	..	2	3	3	3	4	3	..	5	1	9	1	..	12	..	4	..	..	1	..	14	..	..	3	..	2	..	8	..	..	..	5	1	1	1	..	..	13	..	..	..
Oklahoma	15	1	..	1	1	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	2	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	2	1	..	..	..	..	..	..	..	5	..	..	..
Oregon	25	..	..	..	2	1	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	1	5	..	3	..	2	..	..	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	5	..	..	..
Pennsylvania	47	..	..	..	2	1	..	..	1	..	..	..	1	..	..	1	..	1	..	3	1	1	3	..	1	..	..	..	..	1	..	5	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	21	..	..	..
Rhode Island	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	..	..
South Carolina	13	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	1	..	..	..	..	3	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..
South Dakota	5	..	..	..	1	..	..	..	..	..	..	..	1	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Tennessee	42	2	..	2	..	..	..	..	2	..	2	..	1	..	..	..	..	4	..	1	..	2	5	1	..	1	..	..	..	1	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Texas	160	1	..	13	3	4	..	..	..	..	..	..	11	8	6	1	5	17	..	3	..	5	6	5	10	1	5	..	..	..	..	12	..	..	11	6	..	5	..	..	1	12	..	..	1	1	..	2	2	..	3	..	..	..
Utah	26	..	..	..	7	1	..	..	..	..	..	..	1	..	..	..	1	..	..	..	..	2	2	2	2	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	4	..	..	..
Vermont	14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..	1	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	..	..	..
Virginia	32	..	1	..	..	..	..	1	4	..	1	..	1	3	1	..	2	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Washington	46	..	..	..	6	..	..	..	..	..	..	..	..	..	1	..	..	2	..	..	..	..	5	..	5	..	2	..	..	..	..	..	1	..	2	..	..	5	..	..	..	5	..	..	..	..	..	..	..	..	..	2	..	..	..
West Virginia	28	..	..	1	..	..	..	..	..	..	..	..	2	..	..	..	3	..	1	1	..	1	2	..	1	..	..	..	..	..	..	..	..	..	7	..	3	1	..	..	1	1	..	..	..	..	..	..	..	..	..	11	..	..	..
Wisconsin	19	..	..	..	..	..	..	..	..	..	1	1	7	..	1	1	1	..	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	..	..	..	2	1	..	..	6	..	..	..	..	..	4	..	..	..
Wyoming	8	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Alaska, Puerto Rico and Virgin Islands	9	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Totals	**2,547**	**10**	**4**	**41**	**56**	**18**	**4**	**2**	**26**	**3**	**19**	**2**	**163**	**42**	**58**	**26**	**33**	**65**	**7**	**72**	**12**	**82**	**68**	**22**	**102**	**2**	**65**	**0**	**1**	**14**	**0**	**240**	**18**	**1**	**100**	**16**	**10**	**110**	**3**	**10**	**5**	**110**	**32**	**4**	**11**	**51**	**22**	**18**	**40**	**2**	**13**	**702**	**3**	**2**	**5**
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55

communication with the secretary of the licensing board of the state in which he is interested.

The credentials presented by physicians granted licenses in 1944 to practice medicine and surgery without written examination are given in table 10. There were 2,547 so registered on the basis of licenses issued by other states, the District of Columbia, the territories or possessions or foreign countries, the certificate of the National Board of Medical Examiners or one of the government services.

The greatest number of licenses issued by this method in any one state were 469 in California. New York issued 335. Four other states endorsed 100 or more, namely Ohio 106, Michigan 146, New Jersey 159 and Texas 160. The largest group representing the same type of credentials were the 702 diplomates of the National Board of Medical Examiners. On the basis of this certificate 259 were certified in New York. One hundred or more physicians presented licenses issued in Illinois, Missouri, New York, Ohio, Pennsylvania and Tennessee. No physician holding a Nevada or New Mexico certificate applied for registration in another state during the year. In Arizona and in New York one physician was registered on the basis of foreign credentials, presenting licenses from Great Britain and Austria respectively.

Four were admitted to private practice in the Virgin Islands on presentation of satisfactory credentials. Thirteen medical officers of one of the government services received licenses without written examination in four states: California 8, Kentucky 1, Texas 3 and Utah 1.

Two physicians from Alaska were registered in California and one physician presented for endorsement in New York a license obtained in Puerto Rico. The New York Board of Medical Examiners accepted the diploma of a foreign physician in lieu of a licensure credential.

Not included in the table are 24 osteopaths licensed by medical examining boards in seven states. They are omitted from this compilation since the credentials presented were osteopathic licenses. These individuals secured licenses in Indiana 3, New Hampshire 2, Ohio 3, Oregon 8, Texas 1, Wisconsin 5 and Wyoming 2.

Seventy-five licentiates of New York secured licenses to practice in New Jersey, while 61 from New York and 76 from Illinois were registered in California.

Diplomates of the National Board of Medical Examiners were registered on the basis of this credential by forty licensing boards last year. There were 702 individuals who presented these credentials. The greatest number accepted by any one state was in New York, where 259 secured licenses to practice medicine. Of all who were registered by reciprocity and endorsement, over one fourth presented National Board credentials.

The numbers of physicians securing licenses by reciprocity or by endorsement has increased in the last three years. The figure for 1944 (2,547) represented 272 more licenses issued than in 1943.

LICENTIATES REPRESENTING ADDITIONS TO THE MEDICAL PROFESSION

The number of physicians who received their first license to practice medicine and surgery in 1944, and therefore represent additions to the medical profession, are recorded in table 11. Figures represent candidates examined in 1944 and immediately licensed, also those examined in previous years whose licenses were withheld for lack of internship, citizenship and other technicalities and issued in 1944, and those without a state license who were during the year certified on the basis of the examination of the National Board of Medical Examiners, government services, Canadian and foreign credentials. The majority represent recent graduates. However, the majority of the recent graduates are now in the military services and only a small percentage of them can be considered to be additions to the present civilian physician population. It is not known how many of these are in civilian practice.

There were 6,933 additions to the medical profession in 1944. The number removed by death in the same period was 3,627. It would appear, therefore, that the physician population in the United States last year was increased by 3,306. Many more than this latter number were added to the armed forces as medical officers in 1944, so that there has resulted an actual decrease in physicians available to civilians in the course of the year. In view of the accelerated program, one might expect that additions to the profession would be considerably higher. While two classes were graduated from most medical schools in 1943, the number of physicians added to the profession in that year did not increase, since many physicians who obtained M.D. degrees in December of that year were not able to receive licenses until early in the year 1944, owing to administrative details. In 1944 the number in this group was 979 more than in the previous year.

TABLE 11.—*Licentiates Representing Additions to the Medical Profession, 1944*

	Examination	Reciprocity and Endorsement	Total
Alabama	6	1	7
Arizona	4	1	5
Arkansas	56	0	56
California	368	15	383
Colorado	124	0	124
Connecticut	17	13	30
Delaware	20	0	20
District of Columbia	9	11	20
Florida	11	0	11
Georgia	220	6	226
Idaho	3	0	3
Illinois	197	13	210
Indiana	125	1	126
Iowa	34	4	38
Kansas	176	0	176
Kentucky	158	1	159
Louisiana	250	0	250
Maine	9	3	12
Maryland	295	4	299
Massachusetts	120	68	188
Michigan	258	10	268
Minnesota	236	3	239
Mississippi	91	1	92
Missouri	427	7	434
Montana	4	0	4
Nebraska	166	1	167
Nevada	0	0	0
New Hampshire	3	6	9
New Jersey	99	12	111
New Mexico	0	0	0
New York	408	229	637
North Carolina	104	10	114
North Dakota	1	0	1
Ohio	723	5	728
Oklahoma	54	0	54
Oregon	14	1	15
Pennsylvania	807	14	821
Rhode Island	5	6	11
South Carolina	95	0	95
South Dakota	2	0	2
Tennessee	209	2	211
Texas	235	0	235
Utah	7	3	10
Vermont	11	5	16
Virginia	157	1	158
Washington	48	3	51
West Virginia	19	1	20
Wisconsin	70	0	70
Wyoming	0	0	0
Alaska, Virgin Islands, Puerto Rico	14	3	17
Totals	6,469	464	6,933

The greatest number of physicians in any one state, 821, was added to the profession in Pennsylvania. Both New York and Ohio added more than 600, and California and Missouri more than 300. By comparison with 1943 figures [3] it can be noted that considerably more were licensed and represent additions to the profession in 1944 in the cases of Colorado, Georgia, Kansas, Kentucky, Maryland, Michigan, Missouri, Nebraska, Ohio and Pennsylvania. Most significant increases occurred in Ohio and in Pennsylvania, where the increases totaled 474 and 377 respectively.

No one was added to the profession in Nevada, New Mexico or Wyoming, while in seventeen states between 100 and 299 received initial licenses. Twenty-four states, the District of Columbia, Alaska, Virgin Islands and Puerto Rico added fewer than 100.

Of the 6,933 licentiates constituting additions to the medical profession last year, 6,469 secured their licenses by examination and 464 by endorsement of credentials. The latter represent in the main diplomates of the National Board of Medical Examiners.

Table 12 records increases in the physician population grouped in nine geographic divisions. The Middle Atlantic, East North Central and West North Central group of states added the greatest number, over 1,000 each. More than 500 were added in two groups—the South Atlantic and West South Central states. The fewest number of physicians, 146, were added to the medical profession in the Mountain states. Three states in this group—Nevada, New Mexico and Wyoming—did not add a single physician to the medical profession last year.

Comparative figures for nine years and 1944 are given in table 13. Last year the number of physicians representing additions to the medical profession increased 979 over the previous year. In the ten year period the greatest number of physicians were added to the medical profession in 1944.

In ten years there were 60,913 physicians added to the profession; 56,082 were licensed after a successful written examination and 4,831 by reciprocity and endorsement. In the same period 90,162 licenses were issued, 63,163 by examination and 26,999 by endorsement of credentials. Thus 29,249 licenses were obtained by physicians who had previously been licensed to practice medicine.

Estimated figures indicate that on Jan. 1, 1945 the number of physicians in continental United States including those licensed in 1944 was 191,689. Excluding physicians who are in military service, engaged in full time hospital work, retired, engaged in full time teaching or not in practice, there remain approximately 100,000 physicians in private practice, some of whom are part time teachers.

TABLE 12.—*Licentiates Representing Additions to the Medical Profession Grouped in Geographic Divisions, 1944*

	Examination	Reciprocity and Endorsement	Total
New England			
Maine	9	3	12
New Hampshire	3	6	9
Vermont	11	5	16
Massachusetts	120	68	188
Rhode Island	5	6	11
Connecticut	17	13	30
	165	101	266
Middle Atlantic			
New York	408	229	637
New Jersey	99	12	111
Pennsylvania	807	14	821
	1,314	255	1,569
East North Central			
Ohio	723	5	728
Indiana	125	1	126
Illinois	197	13	210
Michigan	258	10	268
Wisconsin	70	0	70
	1,373	29	1,402
West North Central			
Minnesota	236	3	239
Iowa	34	4	38
Missouri	427	7	434
North Dakota	1	0	1
South Dakota	2	0	2
Nebraska	166	1	167
Kansas	176	0	176
	1,042	15	1,057
South Atlantic			
Delaware	20	0	20
Maryland	295	4	299
District of Columbia	9	11	20
Virginia	157	1	158
West Virginia	19	1	20
North Carolina	104	10	114
South Carolina	95	0	95
Georgia	220	6	226
Florida	11	0	11
	930	33	963
East South Central			
Kentucky	158	1	159
Tennessee	209	2	211
Alabama	6	1	7
Mississippi	91	1	92
	464	5	469
West South Central			
Arkansas	56	0	56
Louisiana	250	0	250
Oklahoma	54	0	54
Texas	235	0	235
	595	0	595
Mountain			
Montana	4	0	4
Idaho	3	0	3
Wyoming	0	0	0
Colorado	124	0	124
New Mexico	0	0	0
Arizona	4	1	5
Utah	7	3	10
Nevada	0	0	0
	142	4	146
Pacific			
Washington	48	3	51
Oregon	14	1	15
California	368	15	383
	430	19	449
Territories and Possessions			
Alaska	1	0	1
Virgin Islands	0	1	1
Puerto Rico	13	2	15
	14	3	17
Totals	6,469	464	6,933

TABLE 13.—*Licentiates Representing Additions to the Medical Profession, 1935-1944*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,099	411	5,510
1936	5,548	629	6,177
1937	5,812	612	6,424
1938	5,759	501	6,260
1939	5,584	460	6,044
1940	5,432	455	5,887
1941	5,239	473	5,712
1942	5,558	454	6,012
1943	5,582	372	5,954
1944	6,469	464	6,933
Totals	56,082	4,831	60,913

LICENSURE UNDER THE ACCELERATED PROGRAM

All states in the Union, as well as the District of Columbia, Alaska, Hawaii and Puerto Rico, have made certain adjustments in their licensure legislation or practices, where such were required, to facilitate the licensure of graduates under the accelerated program. Legislation in four states (District of Columbia, Georgia, Illinois and Minnesota) is such as might not provide for students who have completed all of their

3. J. A. M. A. **125**: 133 (May 13) 1944.

medical school work under the accelerated program and spend a week or two less than thirty-six months in medical school. Such students are typical throughout the country because those starting school July 1, 1942, for example, are likely to graduate a week or so prior to July 1, 1945.

TABLE 14.—*Requirements of Preliminary Training by Medical Licensing Boards*

Two Years or More of College		
Alabama	Louisiana	Oklahoma
Alaska	Maine	Oregon
Arizona	Maryland	Pennsylvania
Arkansas	Massachusetts	Puerto Rico
Canal Zone	Michigan	Rhode Island
Colorado	Minnesota	South Carolina
Delaware	Mississippi	South Dakota
District of Columbia	Missouri	Tennessee
Florida	Montana	Texas
Georgia	Nevada	Utah
Hawaii	New Hampshire	Vermont
Idaho	New Jersey	Virginia
Illinois	New Mexico	Washington
Indiana	New York	West Virginia
Iowa	North Carolina	Wisconsin
Kansas	North Dakota	Wyoming
Kentucky	Ohio	
One Year of College		
California	Connecticut *	
High School Graduation or Its Equivalent		
Nebraska		

* Two year college requirement for graduates after 1946.

ACCELERATION OF PREMEDICAL COURSES

The minimum requirement of the Council on Medical Education and Hospitals for admission to approved medical schools since 1918 has been two years of college training, and in 1938 three years was recommended. With the exception of California, Connecticut and Nebraska (table 14) the state licensing boards, by statute in the majority of instances, require that an applicant for licensure must present evidence of having completed two years of college. In November 1942 the Council on Medical Education and Hospitals recommended that for the duration of the war premedical education, including satisfactory courses in physics, biology and inorganic and organic chemistry, be included within two calendar years. Such a program was adopted by practically all medical schools of the country.

The Army Specialized Training and Navy V-12 premedical programs call for less than two years of college

TABLE 15.—*Internship Required by Medical Schools*

College of Medical Evangelists
University of Southern California School of Medicine
Stanford University School of Medicine
Northwestern University Medical School
University of Minnesota Medical School
Duke University School of Medicine
University of Alberta Faculty of Medicine
University of Manitoba Faculty of Medicine
Dalhousie University Faculty of Medicine
University of Montreal Faculty of Medicine

training, but in both of these programs the studies are continuous and provide for the student carrying more than the normal peacetime studies per semester. Both the Army and Navy programs provide for work well in excess of the sixty semester hours constituting the normal two academic years of medical study. The information received from those states whose licensure laws include specific premedical requirements seems to indicate that there should be no licensure difficulties encountered by students whose premedical work was taken under the Army Specialized Training or Navy V-12 or comparably accelerated civilian programs.

REQUIRED INTERNSHIPS

In tables 15 and 16 are listed the medical schools and licensing boards now requiring internships for the M.D. degree and licensure respectively. Six schools in the United States and 4 in Canada require an internship for graduation. Although relatively few schools require the internship for the M.D. degree, this is a requirement for licensure by twenty-three state medical licensing boards, the Arkansas and Connecticut homeopathic medical examining boards, the District of Columbia, Alaska, Canal Zone, Hawaii and Puerto Rico. Table 17 lists these states and indicates the relationship of this requirement to the nine month internship. Eleven states, the Connecticut homeopathic examining board, Alaska, the Canal Zone and Puerto Rico will accept a nine month internship as fulfilling the internship requirement. Ten states and the District of Columbia require an additional three months in a civilian hospital or military service but will permit applicants for licensure to write the examination on completion of the nine month internship but will withhold the license until this is completed. In two states physicians are not eligible to take the examination until after completion of a year's internship, three months of which may be in the military service. This is true

TABLE 16.—*Internship Required by Medical Licensing Boards of All Candidates*

Alabama	Iowa	Pennsylvania
Alaska	Michigan	Puerto Rico
Arkansas (homeo. board)	Montana	Rhode Island
Canal Zone	Nevada	South Dakota
Connecticut (homeo. board)	New Hampshire	Utah
Delaware	New Jersey	Vermont
District of Columbia	New Mexico	Washington
Hawaii	North Dakota	West Virginia
Idaho	Oklahoma	Wisconsin
Illinois	Oregon	Wyoming

Some states require the internship of graduates of medical faculties abroad and of reciprocity or endorsement applicants.

Illinois, Michigan, North Dakota, Pennsylvania and Washington require the internship to be a rotating service, while New Jersey recommends this type of service.

TABLE 17.—*Nine Month Internship*

	Additional Three Months in Civilian Hospital or Military Service Required	
Accepted as Fulfilling Internship Requirement	Will Give Examination at End of Nine Months	Will Not Give Examination Until Completion of Year's Service
Alaska	Alabama [1]	Arkansas (homeo. board)
Canal Zone	Dist. of Columbia [1]	Illinois [2]
Connecticut (homeo. board)	New Jersey [1]	New Mexico
Delaware	North Dakota	
Idaho	Oregon [1,2]	
Iowa [1]	Rhode Island [1]	
Michigan [1]	South Dakota [1,2]	
Montana [1]	Utah [1,2]	
Nevada	Vermont [1]	
New Hampshire	Washington [1]	
Oklahoma [1]	Wisconsin	
Pennsylvania [1]		
Puerto Rico		
West Virginia		
Wyoming		

1. Will also give examination on completion of the medical course but without license until internship is completed.

2. Military medical service must be in a military hospital.

Some states require the internship of graduates of medical faculties abroad and reciprocity or endorsement applicants.

Hawaii which requires an internship for licensure has not reported on the relationship of this requirement to the shortened internship.

Illinois, Michigan, North Dakota, Pennsylvania and Washington require the internship to be a rotating service, while New Jersey recommends this type of service.

also of the homeopathic examining board in Arkansas. Officers seeking licenses in these three states must delay licensure until after the war or seek furloughs to take the examinations. In the past it has been possible for officers to obtain furloughs for this purpose.

Five states (Connecticut, Maryland, Missouri, Texas and Virginia) whose laws do not require an internship

TABLE 18.—*Temporary Permits, 1944*

State	Permit Valid For:	Permits Granted
Alaska	6 mos.	12
Arizona	3 mos.	68
Arkansas	Next board meeting	..
Delaware	1 yr.	3
Florida	6 mos. after cessation of hostilities	37
Georgia	Next board meeting	13
Kansas	Next board meeting	..
Kentucky	1-5 yrs.	8
Louisiana	Next board meeting	24
Maine	Duration of war	9
Mississippi	Next board meeting	22
Nevada	Until June 30, 1947	23
New Hampshire	Varies	..
New Mexico	Next board meeting	..
North Dakota	Next board meeting	..
Pennsylvania	6 mos. after cessation of hostilities	2
Puerto Rico	6 mos. after cessation of hostilities	13
Virginia	Next board meeting	5
Washington	Next board meeting	115
West Virginia	Next board meeting	6
Wyoming	Next board meeting	2
Total		362

withhold the licenses of candidates from schools requiring an internship for the M.D. degree until the internship is completed. In these states the examination may be taken at any time after completion of the medical school course.

The licensing boards of Illinois, Michigan, North Dakota, Pennsylvania and Washington require the internship to be a rotating service, while New Jersey recommends this type of service.

A few of the medical schools and licensing boards maintain their own list of hospitals acceptable for intern training, but the list of approved internships compiled by the Council on Medical Education and Hospitals is generally used.

LICENSURE FOR THE RELOCATED PHYSICIAN

To assist the physician returning to civilian practice or in locating in areas where there are shortages of physicians, the licensing boards of nineteen states, Alaska and Puerto Rico provide for the issuance of temporary permits, usually without immediate examination. These states, the length of the validity of the permit and the number of permits granted during the last calendar year are shown in table 18. During the past year four additional states and Alaska and Puerto Rico have provided for the issuing of temporary permits. Others are considering adjustments, probably impelled in part by the recent recommendation of the Procurement and Assignment Service that such legislation be enacted by states to facilitate the relocation of physicians into needy areas, especially in the case of discharged medical officers desiring such relocation.

In addition, the New Jersey medical practice act exempts from its requirements a lawfully qualified physician and surgeon of another state taking charge temporarily of the practice of a lawfully qualified physician of New Jersey during his absence from the state. Such permission may be granted by the board of medical examiners for a period of not less than two weeks nor more than four months but not to exceed one year in the aggregate.

THE BUREAU OF INFORMATION

Among its other responsibilities, the Bureau of Information of the American Medical Association is helping veteran medical officers with their medical practice and relocation problems. This is done through close association with state and county medical societies as an entirely voluntary effort without any attempt to direct the location of a physician.

An officer can obtain a brief but comprehensive picture of the economic status of any particular area he is interested in from the data contained on county summary sheets. This includes data on population, principal cities, physicians, hospital and medical facilities and pertinent economic, social and financial information. A copy of this summary sheet is forwarded to the inquirer and a copy of the letter to him is sent to the state and county medical society concerned.

In addition to the information contained on the summary sheets, other data are available for interested officers. Requests for full or part time salaried medical positions from industries, institutions and other organizations, requests from practicing physicians for associates, needs for specialists and requests of individuals for practices are cross filed and kept current by a return post card system which keeps the Bureau of Information informed of final locations, filling of vacancies and the securing of physicians.

An active cooperative effort of state and county medical societies in furnishing the Bureau of Information with current, up to date information about needs for doctors will enable the American Medical Association to be of definite help to veteran medical officers.

ANNUAL REGISTRATION

Twenty-seven states, the District of Columbia, Alaska and Hawaii require physicians to register their license annually. In table 19 are listed the states which exact this requirement. Some of these states require such registration whether or not physicians reside in the state. The fee is generally $2. With two exceptions, Colorado and Hawaii, the requirement has been waived for physicians in military service. In some instances legislative action was necessary to obtain a waiver.

CANDIDATES EXAMINED, 1940-1944

In table 20 are tabulated the number of candidates examined for medical licensure in the United States and its territories and possessions for the five year period from 1940 to 1944. For each year there is recorded the number who passed and failed licensing examinations. Totals for the five year period and the percentage of candidates who failed also are given.

TABLE 19.—*Annual Registration*

Alaska	Hawaii	New York
Arizona	Idaho	North Dakota
Arkansas	Iowa	Oklahoma
California	Kansas	Oregon
Colorado	Louisiana	Pennsylvania
Connecticut	Minnesota	Texas
Delaware	Missouri *	Utah
District of Columbia	Montana	Washington
Florida	Nebraska	Wisconsin
Georgia	Nevada	Wyoming

* Biennial registration.

During this period 37,878 examinations were given; 31,935 were successful and 5,943, 15.7 per cent, failed. New York leads in the number of examinations given. In this state in the five year period there were 4,002 successful tests. Other states passing more than 2,000

included Pennsylvania 2,708, California 2,220 and Illinois 2,046. More than 1,000 were examined in seven other states and passed, namely Massachusetts, Michigan, Minnesota, Missouri, Ohio, Tennessee and Texas. The greatest percentage of failures, 55.6, occurred in Massachusetts. The high percentage in this state is due to the fact that, by law, the licensing board admitted to its examinations the graduates of unapproved medical schools and graduates of schools of osteopathy, many of whom repeatedly fail. New York had a failure percentage of 46.8, occasioned in large part by the admittance to examination of a considerable number of graduates of foreign faculties of medicine, who likewise repeatedly fail. Other high percentages of failures occurred in Connecticut, Maine, Nevada, New Hampshire and New Mexico. On the other hand, thirty-four states failed less than 5 per cent in the five year period. These included nine states which had no failures: Arkansas, Delaware, Indiana, Kansas, North Carolina, Oklahoma, South Dakota, Utah and West Virginia.

The percentage of failures in all states has decreased from 20.6 in 1940 to 11.9 in 1944. The lowest percentage of failures in this five year period occurred in 1943, when 10.9 per cent failed.

These figures represent examinations given and not individuals. A candidate who fails more than once in a state in a given year is counted only once, but should he also fail in a succeeding year he is counted in that year also. The same is true of successful candidates who migrate to other states. This group represents a recapitulation of the statistics computed annually and assembled for comparative purposes. It gives only a fair approximation of the number of physicians added to the profession in five years by the written examination method. Table 13, page 114, gives the corrected compilation of the number of physicians representing additions to the medical profession for this period.

TABLE 20.—*Candidates Examined, 1940–1944*

	1940		1941		1942		1943		1944		Total for Five Years		
	P	F	P	F	P	F	P	F	P	F	P	F	%F
Alabama	26	0	26	3	34	0	20	0	20	0	126	3	2.3
Arizona	20	1	17	0	9	0	6	0	11	0	63	1	1.6
Arkansas	58	0	60	0	62	0	65	0	115	0	360	0	0.0
California	396	29	400	11	459	15	507	12	458	14	2,220	81	3.5
Colorado	75	4	54	4	68	3	113	3	79	3	389	17	4.2
Connecticut	53	33	80	36	59	31	62	12	34	18	288	130	31.1
Delaware	15	0	18	0	7	0	9	0	27	0	76	0	0.0
Dist. of Columbia	49	2	33	0	27	0	42	2	26	2	177	6	3.3
Florida	131	6	143	7	110	8	129	8	130	9	643	38	5.6
Georgia	88	0	94	2	96	0	195	0	125	1	598	3	0.5
Idaho	40	1	30	0	12	1	9	1	15	0	106	3	2.8
Illinois	542	24	474	46	421	48	391	29	218	25	2,046	172	7.8
Indiana	125	0	120	0	128	0	233	0	126	0	732	0	0.0
Iowa	67	5	67	0	44	1	106	8	82	8	366	22	5.7
Kansas	92	0	92	0	99	0	86	0	179	0	548	0	0.0
Kentucky	77	0	84	0	86	0	161	1	78	0	486	1	0.2
Louisiana	154	1	145	1	175	0	228	2	255	4	957	8	0.8
Maine	32	14	38	12	42	6	29	3	13	3	154	38	19.8
Maryland	175	18	177	9	165	11	296	14	151	4	964	56	5.5
Massachusetts	338	299	254	288	201	251	257	294	162	261	1,212	1,393	55.6
Michigan	247	0	239	0	196	0	298	2	189	0	1,169	2	0.2
Minnesota	196	0	240	0	199	1	290	0	197	0	1,122	1	0.1
Mississippi	42	0	38	0	43	2	113	1	60	0	296	3	1.0
Missouri	179	0	196	0	182	1	421	1	207	0	1,185	2	0.2
Montana	9	0	7	1	7	1	4	0	3	0	30	2	6.2
Nebraska	84	0	92	0	77	2	155	15	81	11	489	28	5.4
Nevada	3	1	5	2	1	0	0	1	1	0	10	4	28.6
New Hampshire	9	1	10	1	3	3	5	4	9	4	36	13	26.5
New Jersey	179	36	155	29	110	10	150	11	104	11	698	97	12.2
New Mexico	0	1	2	0	0	0	1	0	0	0	3	1	25.0
New York	956	1,088	888	968	1,071	660	633	443	454	362	4,002	3,521	46.8
North Carolina	65	0	54	0	77	0	115	0	105	0	416	0	0.0
North Dakota	24	0	15	1	6	1	1	0	3	0	49	2	3.9
Ohio	305	16	263	14	274	6	624	22	329	25	1,795	83	4.4
Oklahoma	47	0	54	0	54	0	114	0	72	0	341	0	0.0
Oregon	33	0	22	0	45	0	52	5	11	5	163	10	5.8
Pennsylvania	478	24	446	18	456	21	475	12	853	20	2,708	95	3.4
Rhode Island	19	0	22	0	35	0	20	0	13	3	109	3	2.7
South Carolina	41	0	45	0	46	0	91	0	51	1	274	1	0.4
South Dakota	7	0	9	0	5	0	6	0	3	0	30	0	0.0
Tennessee	188	1	199	4	190	0	201	0	237	0	1,015	5	0.5
Texas	209	25	177	13	289	15	195	4	303	3	1,173	60	4.9
Utah	9	0	15	0	14	0	27	0	30	0	95	0	0.0
Vermont	21	1	18	0	24	1	19	0	7	0	89	2	2.2
Virginia	142	1	146	3	145	1	264	1	158	9	855	15	3.2
Washington	48	0	60	1	60	0	54	1	75	0	306	2	0.6
West Virginia	38	0	34	0	27	0	23	0	24	0	146	0	0.0
Wisconsin	113	0	120	0	124	1	176	0	74	0	607	1	0.2
Wyoming	16	1	8	0	0	0	0	0	0	0	24	1	4.0
U. S. Territories & Possessions	30	2	63	8	54	5	14	2	28	0	189	17	8.3
Total Examined	7,925		7,539		7,224		8,399		6,791		37,878		
Passed	6,290		6,057		6,118		7,485		5,985		31,935		
Failed	1,635		1,482		1,106		914		806		5,943		
Percentage Failed	20.6		19.7		15.3		10.9		11.9		15.7		

REGISTRATION, 1904-1944

A study of totals and percentages for forty-one years (1904-1944) is included in table 21. This tabulation covers physicians registered by written examination and by reciprocity or endorsement of credentials. There is no definite trend in the numbers annually registered from 1904 to 1933, although in 1918 the number registered dropped to the all time low record of 4,231. After 1933 there was an upward trend for a time followed by a decline which terminated in 1942. The decrease of more than 1,200 in 1918 was due to the sudden withdrawal of physicians and recent graduates from civilian life during World War I. By contrast, in 1943 the number registered increased almost 1,300 over the preceding year. The increase is a result of the accelerated curriculum and the graduation of two classes by many medical schools in that year. Under the accelerated curriculum the majority of medical schools had one graduating class in 1944, which accounts for the decrease in the numbers examined. Unless appropriate measures are adopted at once, there will be a sharp decline in graduates and licenses issued commencing in 1948. Even if such adjustments are made now there will be a decline in graduates, because inadequate numbers of qualified students are now permitted to engage in premedical studies.

TABLE 21.—*Registration, 1904–1944*

Year	Examined	Passed	Percentage Failed	Reciprocity or Endorsement	Total Registered
1904	7,056	5,693	19.3	1,005	6,698
1905	7,178	5,688	20.8	394	6,082
1906	8,040	6,373	20.7	1,502	7,875
1907	7,279	5,731	21.3	1,427	7,158
1908	7,775	6,089	21.7	1,284	7,373
1909	7,295	5,865	19.6	1,381	7,246
1910	7,011	5,719	18.4	1,640	7,359
1911	6,964	5,582	19.8	1,243	6,825
1912	6,880	5,467	20.5	1,273	6,740
1913	6,453	5,253	18.6	1,292	6,545
1914	5,579	4,379	21.5	1,439	5,818
1915	5,334	4,507	15.5	1,399	5,906
1916	4,878	4,151	14.9	1,353	5,504
1917	4,753	4,084	14.1	1,360	5,444
1918	3,667	3,184	13.2	1,047	4,231
1919	4,750	4,074	14.2	2,546	6,620
1920	4,796	4,062	15.3	2,558	6,620
1921	4,825	4,228	12.4	2,186	6,414
1922	4,031	3,539	12.2	2,073	5,612
1923	4,727	4,028	14.8	2,405	6,433
1924	5,392	4,756	11.8	1,923	6,679
1925	6,002	5,450	9.2	1,861	7,311
1926	5,770	5,314	7.9	1,955	7,269
1927	5,389	5,002	7.2	2,176	7,178
1928	5,458	5,090	6.7	2,228	7,318
1929	5,629	5,282	6.2	2,420	7,702
1930	5,571	5,255	5.7	2,366	7,621
1931	5,611	5,263	6.2	2,211	7,476
1932	5,675	5,247	7.6	1,885	7,132
1933	5,673	5,244	7.6	1,989	7,233
1934	6,144	5,627	8.4	2,160	7,788
1935	6,443	5,859	9.1	2,196	8,055
1936	6,917	6,223	10.0	2,775	8,998
1937	7,334	6,604	10.0	3,203	9,807
1938	7,461	6,589	11.7	2,956	9,545
1939	7,754	6,493	16.3	2,872	9,365
1940	7,925	6,290	20.7	2,865	9,155
1941	7,539	6,057	19.7	2,758	8,815
1942	7,221	6,118	15.4	2,469	8,587
1943	8,399	7,485	10.9	2,336	9,821
1944	6,791	5,985	11.9	2,571	8,556

There was an increase in registration on the basis of credentials in 1944. It is presumed that medical officers returning to civilian practice are making use of this means of obtaining licensure, if they are planning to relocate rather than return to their former practice.

The percentage of failures gradually dropped from 19.3 in 1904, when a great many proprietary medical schools were functioning, to 5.7 in 1930. Improvements in the standards of medical education have resulted in this decrease of failures in licensing examinations. With the migration of physicians to this country beginning in 1936 and the resultant licensure difficulties, the percentage of failures again began to rise, until they reached a peak of 20.7 in 1940. This rise is attributable also to the inability of graduates of unapproved schools to obtain licensure successfully without many failures. In the last two years the number of foreign graduates applying for licensure has considerably decreased. In 1944 also there was a decrease in the number of graduates of unapproved institutions registered.

TABLE 22.—*Graduates of Approved Schools and Others Registered, 1922–1944*

	Graduates of Approved Schools		Others		
	Number	Per Cent of Total	Number	Per Cent of Total	Totals
1922	4,519	80.5	1,093	19.5	5,612
1923	5,196	80.8	1,237	19.2	6,433
1924	5,687	85.1	992	14.9	6,679
1925	6,314	86.4	997	13.6	7,311
1926	6,441	88.7	828	11.3	7,269
1927	6,410	89.4	768	10.6	7,178
1928	6,585	90.1	733	9.9	7,318
1929	7,003	91.0	699	9.0	7,702
1930	7,011	92.1	610	7.9	7,621
1931	6,932	92.8	544	7.2	7,476
1932	6,675	93.7	457	6.3	7,132
1933	6,774	93.7	459	6.3	7,233
1934	7,171	92.1	617	7.9	7,788
1935	7,362	91.5	693	8.5	8,055
1936	7,932	88.2	1,066	11.8	8,998
1937	8,389	85.6	1,418	14.4	9,807
1938	8,315	87.1	1,230	12.9	9,545
1939	8,067	86.2	1,298	13.8	9,365
1940	7,780	85.0	1,375	15.0	9,155
1941	7,766	88.1	1,049	11.9	8,815
1942	7,289	84.9	1,298	15.1	8,587
1943	8,632	87.8	1,189	12.2	9,821
1944	7,690	89.9	866	10.1	8,556
Total	161,940	88.3	21,516	11.7	183,456

In analyzing this table it should be remembered that the figures represent multiple examinations by individuals in some instances rather than actual additions to the profession.

GRADUATES OF APPROVED SCHOOLS AND OTHERS REGISTERED, 1922-1944

The educational fitness of physicians registered for the practice of medicine is recorded in table 22. In the computation of these figures, schools rated as class A and B by the Council on Medical Education and Hospitals of the American Medical Association since 1907 are classified as approved. In the column "Others" are included individuals who graduated prior to 1907, when the first classification of schools was made, graduates of foreign faculties of medicine, class C graduates, osteopaths given recognition by medical licensing boards and graduates of schools not approved by the Council. In 1928 the classification A, B and C by the Council was discontinued and a list of approved medical schools has since been maintained.

There were 8,556 candidates registered in 1944, of whom 7,690, 89.9 per cent, represented graduates of approved schools and 866, 10.1 per cent, the group designated as others.

In twenty-three years 183,456 were registered, including 161,940 approved graduates (88.3 per cent) and 21,516 others (11.7 per cent). Since 1922 the number of graduates of approved schools has increased

TABLE 23.—*Graduates of Unapproved Medical Schools Registered, 1939–1944*

	Examination						Reciprocity and Endorsement						
	1939	1940	1941	1942	1943	1944	1939	1940	1941	1942	1943	1944	Total
Arizona	2	0	0	0	0	0	0	0	0	0	0	0	2
California	0	1	1	0	0	0	1	0	0	0	0	0	3
Florida	1	0	0	0	0	0	0	0	0	0	0	0	1
Illinois	51	48	51	51	57	45	0	0	0	0	0	0	303
Indiana	0	0	0	0	0	0	1	2	0	1	0	0	4
Iowa	0	0	0	0	0	0	0	0	1	0	0	0	1
Kentucky	0	0	0	0	2	0	2	2	0	0	0	0	6
Massachusetts	79	98	90	105	177	102	0	0	0	0	0	0	651
Mississippi	0	0	0	1	0	1	0	0	0	0	0	0	2
Missouri	0	0	1	0	1	0	0	0	0	0	0	1	3
Nevada	0	0	0	0	0	0	0	0	0	0	0	1	1
New Jersey	0	0	0	0	0	0	4	13	8	0	0	0	25
New Mexico	0	0	0	0	0	0	0	2	0	0	0	0	2
New York	0	0	0	0	0	0	12	8	0	0	0	0	20
Ohio	36	0	0	0	0	0	0	0	0	0	0	0	36
Pennsylvania	1	5	0	0	0	0	0	0	0	0	0	0	6
Texas	4	6	0	0	0	0	0	0	0	0	0	0	10
Virginia	1	0	0	0	1	5	0	0	0	0	0	0	7
Wisconsin	0	0	0	0	0	0	0	0	0	0	1	0	1
Hawaii	0	0	1	0	1	0	0	0	0	0	0	0	2
Puerto Rico	0	1	0	0	0	0	0	0	0	0	0	0	1
Totals	175	159	144	157	239	153	20	27	9	1	1	2	1,087

well beyond 4,500, representing more than 80 per cent of those annually registered. Until the influx of foreign graduates in 1936, those in the second group since 1924 have been fewer than 1,000. The number in this group was considerably decreased in 1944 and 323 lower than the figure for 1943.

In computing the figure for 1944 it is revealed that the 8,556 candidates registered represented 7,640 graduates of approved or class A medical schools, 50 were graduates of schools rated in class B at the time of graduation, 350 were graduates of class C or unapproved schools and 516 were foreign graduates and graduates of medical schools before 1907, when the first classification of medical schools was made.

GRADUATES OF UNAPPROVED MEDICAL SCHOOLS REGISTERED, 1939-1944

Graduates of institutions which do not meet the educational standards outlined by the House of Delegates of the American Medical Association and administered

TABLE 24.—*Graduates of Schools of Osteopathy Registered by Medical Boards, 1939–1944*

	Examination						Reciprocity and Endorsement						
	1939	1940	1941	1942	1943	1944	1939	1940	1941	1942	1943	1944	Total
Colorado	22	15	2	9	9	7	0	0	0	0	0	0	64
Connecticut	1	0	0	0	5	5	0	0	0	0	0	0	11
Delaware	0	0	0	0	0	3	0	0	0	0	0	0	3
Dist. Columbia	0	1	0	2	0	0	0	0	2	1	0	0	6
Indiana	4	7	3	4	2	3	0	1	3	2	3	3	35
Massachusetts	10	27	26	13	5	4	0	0	0	0	0	0	85
Nebraska	0	0	0	0	6	0	0	0	0	0	1	0	7
New Hampshire	0	2	0	0	0	3	0	2	0	1	1	2	11
New Jersey	45	47	32	9	18	30	0	0	0	0	0	0	181
Ohio	0	0	0	0	158	72	0	0	0	0	0	3	233
Oregon	1	0	2	1	0	0	1	1	2	5	3	8	24
Texas	19	20	13	17	18	38	17	1	1	1	2	1	148
Virginia	0	0	3	0	0	0	0	0	1	0	0	0	4
Wisconsin	0	1	2	5	6	0	0	0	0	1	16	5	36
Wyoming	0	1	0	0	0	0	2	0	0	2	1	2	8
Totals	102	121	83	60	227	165	20	5	9	13	27	24	856

by the Council on Medical Education and Hospitals were registered in nineteen states, Hawaii and Puerto Rico during the last six years. The number so registered will be found in table 23. Figures are given separately for those licensed by written examination and

by endorsement of credentials. In the six years shown 1,087 were registered, 1,027 by examination and 60 by reciprocity or endorsement. In 1944 there were 155 so registered, 153 by examination and 2 without written examination in six states, namely Illinois, Massachusetts, Mississippi, Missouri, Nevada and Virginia.

The large numbers of unapproved graduates licensed in Illinois and Massachusetts result from the nature of the licensing laws in these two states, which accounted for over 90 per cent of these licenses. However, 28 graduates of substandard schools have been licensed in other states in the past four years.

may practice either medicine, surgery or both, as the case may be, if he passes a satisfactory examination before the medical examining board. In Delaware and the District of Columbia osteopaths are granted the right to practice surgery. In Indiana the licenses issued to osteopaths under the 1945 amendment to the medical practice act authorize the holders to practice medicine and surgery. Prior licentiates have been authorized to practice osteopathy, surgery and obstetrics. In Massachusetts the medical practice act, by definition, includes osteopathy in the practice of medicine and does not differentiate the type of license issued to an

TABLE 25.—*Requirements of Candidates for Medical Licensure on the Basis of Credentials Obtained in Countries Other Than the United States and Canada*

	Admitted to Examination	Admitted by Endorsement of State License *	Citizenship	Basic Science Certificate	Internship in Hospital in United States	Further Medical Training	Examination Fee, Dollars	Other Requirements
Alabama	+	..	+	..	+	..	10	1
Arizona	Not accepted							
Arkansas (reg. and homeo. boards)	Not accepted							
California	+	+[21]	..	..	+[18]	+[18]	25	11
Colorado	+	..	1st P	+	..	..	25[4]	3
Connecticut (regular board)	+	..	1st P	+	..	..	25	..
Delaware (regular board)	+	..	+	..	+	..	25	5,22
District of Columbia	+	+[6]	..	+	+	..	25	19
Florida	+	..	+	+	..	+[7]	25	..
Georgia	+	..	+	..	..	+[7]	20	..
Idaho	+	..	+	..	+	..	25	..
Illinois	+	..	1st P	..	+	..	10	8
Indiana	+	+	..	..	..	+[7]	25	..
Iowa	+[10]	..	+	+	+[2]	+[2]	25	..
Kansas	+	..	+	..	..	..	25	11
Kentucky	Not accepted[27]							
Louisiana (reg. and homeo. boards)	Not accepted							
Maine	+	+	+	..	+	..	27	11
Maryland (reg. and homeo. boards)	+	..	1st P	..	+[26]	..	25	19
Massachusetts	+	..	1st P	..	..	..	25	..
Michigan	+	+	+	+	+	+[7]	25	..
Minnesota	Not accepted							
Mississippi	+	..	+	..	+	..	10[3]	..
Missouri	+	+	+	..	..	..	15	..
Montana	Not accepted[25]							
Nebraska	+	+	+	+	..	..	25	..
Nevada	Not accepted							
New Hampshire	+	+[12]	+	..	+	..	20	..
New Jersey	+	+	+	..	+[17]	..	25	..
New Mexico	Not accepted							
New York	+	+	1st P	..	..	..	25	14
North Carolina	Not accepted							
North Dakota	+	..	+	..	+	..	25	11
Ohio	+	+	+	..	..	..	25	..
Oklahoma	Not accepted							
Oregon	Not accepted							
Pennsylvania	+	..	1st P	..	+	..	25	..
Rhode Island	+	..	1st P	+	+[16]	+[16]	20	13
South Carolina	Not accepted[12]							
South Dakota	+	..	1st P	+	+	..	20	..
Tennessee	Not accepted							
Texas	+	..	+	..	..	..	25	..
Utah	Not accepted							
Vermont	Not accepted[23]							
Virginia	+	..	+	15	15	+	25	24
Washington	+	..	1st P	+	+	+[7]	25	9
West Virginia	Not accepted							
Wisconsin	Not accepted							
Wyoming	Not accepted							
Alaska	+	+	+	..	+	..	25	..
Hawaii	+	..	+	..	+	..	25	12
Puerto Rico	+	+	+	..	+	..	25	..

* Refer to chart of "Reciprocity and Endorsement Policies" for further data.

1. Certificate of National Board of Medical Examiners and licensure in country in which school of graduation is located.
2. Internship or one year in medical school in United States.
3. Certificate of National Board of Medical Examiners.
4. For graduates of last five years; if more than five years $50.
5. Residence of one year in Delaware.
6. If similar privileges are accorded licentiates of District of Columbia by licensing agency of jurisdiction from which applicant comes.
7. Senior year in class A medical school in United States.
8. Graduates of European medical colleges after July 1, 1936, Switzerland excepted, shall not be eligible for licensure. Graduates prior to this date may be accepted for the regular written and clinical examination after completing rotating internships in approved hospitals in the United States.
9. Enemy aliens not accepted.
10. Application must be filed six months prior to date of examination.
11. Licensed to practice medicine and surgery in country in which school of graduation is located, otherwise required to complete senior year in approved medical school in United States.
12. Diplomates of National Board of Medical Examiners eligible.
13. License to practice medicine and surgery in the country in which the school of graduation is located.
14. Matriculants after Jan. 1, 1940 not accepted.
15. At the discretion of the board.
16. Internship and graduate work.
17. Internship completed in foreign countries after July 1, 1934 not acceptable.
18. Rotating internship in approved hospital in the United States or completion of senior year in class A medical school in the United States.
19. These requirements apply also to graduates of Canadian schools.
20. Graduates from foreign medical colleges accepted if they present also a diploma from an approved medical school in the United States.
21. Provided standard was the same as California on the same date.
22. Degree from an American medical college acceptable to the Medical Council of Delaware required.
23. Diplomates of the National Board of Medical Examiners accepted. Citizenship required.
24. Very limited number contracting to practice in rural districts may be accepted.
25. Effective July 1, 1943.
26. Homeopathic board requires one year internship in homeopathic hospital in the United States.
27. Will consider limited license for applicant with acceptable credits from National Board of Medical Examiners and states maintaining reciprocity.

GRADUATES OF SCHOOLS OF OSTEOPATHY REGISTERED BY MEDICAL EXAMINING BOARDS, 1939-1944

The number of graduates of schools of osteopathy granted the privilege of practicing medicine or surgery or both by the medical examining boards of fourteen states and the District of Columbia for six years (1939-1944) are given in table 24. There have been 856 such individuals registered since 1939, 758 by examination and 98 by endorsement.

In 1944 twelve states registered 165 by examination and 24 by recognition of their credentials, 189 in all. The situation in these fifteen states is as follows:

In Colorado an osteopath receives a license to practice medicine. In Connecticut, any registered osteopath osteopathic applicant. According to a law passed in Nebraska in 1943 "any person now licensed to practice osteopathy may, if application is made prior to July 1, 1948 and upon payment of the prescribed fee, take the first regular examination given after the application is made before the Board of Examiners in Medicine . . . if successful he or she shall receive a license to practice medicine and surgery in the state." In New Hampshire, osteopaths are granted the right to practice medicine and surgery. New Jersey provides that osteopaths licensed prior to Nov. 1, 1941 who furnish proof, prior to that date, of having served for a period of two years as an intern or resident surgeon in an osteopathic or medical hospital approved by the board of medical examiners, of having completed a postgraduate course

TABLE 26.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1944*

| Marginal Number | | 1 Alabama | | 2 California | | 3 Colorado | | 4 Connecticut | | 5 Illinois | | 6 Iowa | | 7 Louisiana | | 8 Maine | | 9 Maryland | | 10 Massachusetts | | 11 Mississippi | | 12 Missouri | | 13 New Jersey | | 14 New York | | 15 Ohio | | 16 Pennsylvania | | 17 Rhode Island | | 18 South Dakota | | 19 Texas | | 20 Virginia | | 21 Washington | | 22 Puerto Rico | | Totals | Examined—Passed | Examined—Failed | Percentage of Failures | Number of Boards Examined by | Marginal Number |
|---|---|---

| | | |

of two years in a college of osteopathy or medicine approved by the board, or of having had at least three years of practice in a hospital approved by the board, can be admitted to an examination in pharmacology, therapeutics and surgery and, if successful, can obtain a license to practice medicine and surgery. Since 1941 all osteopathic applicants who have met the requirements of the medical practice act have been licensed to practice medicine and surgery.

A law passed in Ohio in 1943 gives osteopaths who obtain their licenses under that act the right to practice osteopathic medicine and surgery. In Oregon they are granted the right to practice surgery. The medical practice act of Texas provides for the issuing of a license to practice medicine only and osteopaths are issued licenses unrestricted in scope. In Virginia, osteopaths may obtain the right to perform surgery with the use of instruments if they satisfy the board of medical examiners that they have had adequate clinical facilities in their respective college of graduation or by hospital work to enable them to perform such operations. Wisconsin grants osteopaths the privilege to practice surgery and in Wyoming the statutes contain no specific provision for the licensing of osteopaths. The medical practice act of the latter state provides that the certificate issued to all applicants "shall be deemed licenses to practice medicine in all branches in which the applicant has taken examination in the state."

PHYSICIANS EXAMINED ON THE BASIS OF CREDENTIALS OBTAINED IN COUNTRIES OTHER THAN THE UNITED STATES AND CANADA

The Council on Medical Education and Hospitals does not grade or classify medical schools outside the United States and Canada. It does not attempt to evaluate institutions which it is not in a position to visit to determine whether they meet the minimal essentials of an acceptable medical school as outlined by the Council. This was true even before the war.

For a period of twelve years beginning in 1926 the credentials of physicians coming from abroad were verified by the Council through official correspondence with the medical schools directly or through the diplomatic services. Prior to the onset of the war in Europe it was necessary to discontinue this effort, and on the licensing boards rests the responsibility of evaluating the credentials presented by these graduates. In the 1942 edition of the American Medical Directory a symbol in the biographic data of foreign graduates indicates when the information given is the licensing board's record of the credential accepted as meeting the educational qualifications for licensure. The absence of the symbol may be interpreted to indicate that official verification is on file in the office of the Council.

The requirements of candidates for medical licensure in the United States, Alaska, Hawaii and Puerto Rico on the basis of credentials obtained in countries other than the United States and Canada are given in table 25. Eighteen states report that the holders of such credentials are not eligible for licensure. Eighteen states, Alaska, Hawaii and Puerto Rico require full citizenship and ten states naturalization papers as a condition precedent to taking the examination. California, Indiana and the District of Columbia make no reference to citizenship. In some states the recognition or nonrecognition of such individuals is by rule of the board, in others the provision is by statute. Ten states require a certificate from the state board of examiners in the basic sciences. In eighteen states, Alaska, Hawaii and Puerto Rico an internship in a hospital in the United States is a prerequisite. Additional qualifications of individual states are given in footnotes. No state has changed its laws regarding these graduates or relaxed its requirements in recent years.

Table 26 presents figures relating to physicians examined on the basis of credentials obtained in countries other than the United States and Canada by licensing boards in 1944. The figures represent both American and foreign born physicians educated abroad. Ninety-two faculties of medicine and two licensing corporations of nineteen European countries and nine other countries are represented. There were 691 examined by twenty-one states and Puerto Rico, of whom 325 passed and 366, 53.0 per cent, failed. Graduates of the University of Vienna represented the largest group, 135, who were examined in thirteen states, with a failure percentage of 46.7. Five states examined 54 graduates of the University of Berlin, of whom 48.1 per cent failed. More than 35 graduates of the Universities of Paris, Bologna and Lausanne also were examined in the United States last year.

TABLE 27.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1930–1944*

Year	Number Examined	Passed	Percentage Failed
1930	167	92	44.9
1931	158	91	42.4
1932	182	96	47.3
1933	200	129	35.5
1934	285	170	40.2
1935	437	303	30.7
1936	588	382	35.0
1937	920	637	30.8
1938	1,164	716	38.5
1939	1,691	839	50.4
1940	2,088	948	54.7
1941	1,717	698	59.2
1942	1,630	890	45.4
1943	1,031	518	49.8
1944	691	325	53.0
Totals	12,949	6,834	47.2

The greatest number of foreign graduates examined by any one state was 510 in New York, of whom 224 passed and 286 (56.1 per cent) failed. No other state tested more than 37 of these physicians. Fewer than 5 were examined by eleven states. The proportion of failures in seventy-three schools of the total of 94 was 25 per cent or more.

Table 27 records the number of graduates of faculties of medicine abroad examined for medical licensure in the United States in fifteen years, 1930 to 1944 inclusive. In this period 12,949 were examined, of whom 6,834 passed and 47.2 per cent failed. There has been a decrease of 340 in the number examined in 1944 as compared with the previous year. In 1943 there were 599 fewer examined than in the previous year. The percentage of failures however has not changed significantly in recent years. The greatest number of failures occurred in 1941 when 59.2 per cent failed. At no time in this fifteen year period did fewer than 30.7 per cent fail.

From 1936 to 1940 there were large annual increases in foreign graduates examined, so that in 1940 there were over three times as many tested as in 1936. Since 1940 there have been annual decreases. The number last year was 1,397 fewer than that of 1940 but has not yet reached the average number of foreign graduates examined annually prior to 1936 and before the increased migration of foreign physicians to this country from Europe.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Basic science requirements underlying the practice of the healing arts have been established by legislative action in seventeen states and the District of Columbia. A basic science law provides for the establishment of a board of examiners and requires that each person who desires to practice the healing arts appear before that board and demonstrate his knowledge. Such boards are distinct from licensing boards. A certificate of proficiency in the basic sciences does not authorize the possessor to practice the healing art; it enables him only to apply for licensure so to practice.

TABLE 28.—*States Having Basic Science Laws and Year of Enactment*

Arizona	1936	Nebraska	1927
Arkansas	1929	New Mexico	1941
Colorado	1937	Oklahoma	1937
Connecticut	1925	Oregon	1933
District of Columbia	1929	Rhode Island	1940
Florida	1939	South Dakota	1939
Iowa	1935	Tennessee	1943
Michigan	1937	Washington	1927
Minnesota	1927	Wisconsin	1925

Connecticut and Wisconsin were the first states to adopt such legislation. Laws were passed in these states in 1925. Other states comprising the group, together with the year of enactment of their basic science law, are recorded in table 28.

The subjects in which examinations are conducted by the respective states and the District of Columbia are shown in table 29. These subjects are specified by statute. The examining boards are not authorized to add any subjects or to refrain from giving an examination in any subject specified by the law. All eighteen boards examine in anatomy, pathology and physiology, sixteen examine in biochemistry, fourteen in bacteriology, eight in hygiene, two in diagnosis and one in public health.

TABLE 29.—*Subjects Included in Basic Science Examinations*

	Examinations Required in							
	Anatomy	Bacteriology	Chemistry	Diagnosis	Hygiene	Pathology	Physiology	Public Health
Arizona	+	+	+	..	+	+	+	..
Arkansas	+	+	+	..	..	+	+	..
Colorado	+	+	+	..	..	+	+	..
Connecticut	+	..	..	+	+	+	+	..
Dist. Columbia	+	+	+	..	..	+	+	..
Florida	+	+	+	..	..	+	+	..
Iowa	+	+	+	..	+	+	+	..
Michigan	+	+	+	..	+	+	+	+
Minnesota	+	+	+	..	+	+	+	..
Nebraska	+	+	+	..	+	+	+	..
New Mexico	+	+	+	..	..	+	+	..
Oklahoma	+	+	+	..	..	+	+	..
Oregon	+	..	+	..	+	+	+	..
Rhode Island	+	+	+	..	..	+	+	..
South Dakota	+	+	+	..	..	+	+	..
Tennessee	+	+	+	..	..	+	+	..
Washington	+	..	+	..	+	+	+	..
Wisconsin	+	..	..	+	..	+	+	..

The results of examinations held in these states or the number of certificates issued on the basis of endorsement during the calendar year 1944 are presented in tables 30 and 31. Applying for a basic science certificate, the candidate is not required to mention his school of practice. Official reports which formed the basis for these compilations in some instances included the name of the candidate and but little additional data other than perhaps the name of the high school attended and the present address of the applicant. However, by checking the biographic and medical student records of the American Medical Association and various directories it has been possible to determine the profession of the majority of the candidates. The figures here presented are tabulated in four groups, namely physicians and medical students, osteopaths, chiropractors and unclassified applicants. The latter category includes those for whom it was not possible to determine the profession represented. The unclassified group in Connecticut includes doctors of naturopathy, while in Rhode Island doctors of dentistry represent the unclassified group. The American Medical Association maintains a complete file of physicians and medical students, so that it may be presumed that the unclassified group represents mainly osteopaths and chiropractors which have not been identified by checking the directories and other reference material available.

TABLE 30.—*Applicants Examined, 1944*

	Physicians and Medical Students		Osteopaths		Chiropractors		Unclassified		Total Examined	Passed	Failed	Percentage Failed
	P	F	P	F	P	F	P	F				
Arizona	26	0	0	0	0	0	3	0	43	29	14*	32.6
Arkansas	77	1	0	0	0	0	0	0	78	77	1	1.3
Colorado	110	15	2	2	0	0	8	1	138	120	18	13.0
Connecticut	76	4	1	0	0	2	0	2	85	77	8	9.4
District of Columbia	11	2	0	1	0	0	0	0	14	11	3	21.4
Florida	173	53	10	6	3	6	3	2	256	189	67	26.1
Iowa	125	45	12	19	0	0	72	47	320	209	111	34.7
Michigan	280	102	5	12	0	0	25	19	443	310	133	30.0
Minnesota	236	41	11	9	0	0	21	16	334	268	66	19.8
Nebraska	122	23	0	0	0	0	14	2	161	136	25	15.5
New Mexico	2	1	4	0	0	0	0	0	7	6	1	14.3
Oklahoma	71	1	0	0	0	0	0	0	72	71	1	1.4
Oregon	72	20	6	1	0	0	3	10	112	81	31	27.7
Rhode Island	35	2	1	0	2	0	22	3	65	60	5	7.7
South Dakota	9	0	1	1	0	0	0	0	11	10	1	9.1
Tennessee	215	77	0	0	0	0	12	2	306	227	79	25.8
Washington	131	28	6	12	0	1	0	4	182	137	45	24.7
Wisconsin	97	1	0	0	0	0	29	9	136	126	10	7.4
Totals—Examined	2,284		122		14		329		2,763			
Totals—Passed	1,868		59		5		212		.....	2,144		
Totals—Failed	416		63		9		117		.....	.....	619	
Percentage failed	18.2		51.6		64.3		35.6		.....	.....	...	22.4

* Nature of practice undetermined, since names of failures not supplied.

The eighteen basic science boards examined in 1944 a total of 2,763 candidates (table 30). Physicians and medical students represent the greatest number examined. There were 2,284 in this group. There were 122 osteopaths examined, 14 chiropractors, and 329 were placed in the unclassified group. Of all the applicants 22.4 per cent failed. If a candidate failed more than once in a given year he is regarded as a single failure. Of the physicians or medical students

examined, 18.2 per cent failed, osteopaths 51.6 per cent, chiropractors 64.3 per cent and unclassified 35.6 per cent. Among those who were successful there were 1,868 physicians or medical students, 59 osteopaths, 5 chiropractors, and 212 were unclassified. The basic science board of Michigan examined the greatest number of applicants, 443, representing 382 physicians and medical students and 61 others. Of those examined, 30 per cent failed. Iowa, Minnesota and Tennessee respectively examined more than 300 candidates. The percentages of failures in these states were respectively 34.7, 19.8 and 25.8. Four states reported 1 failure each.

Osteopaths were tested in all states except Arizona, Arkansas, Nebraska, Oklahoma, Tennessee and Wisconsin. Chiropractors appeared for examination in four states—Connecticut, Florida, Rhode Island and Washington.

It is the policy of the Arizona Board of Examiners in the Basic Sciences to omit the names of applicants who failed examinations. Failures for this state are recorded only in the total column.

Ten states granted certificates without examination —by reciprocity, endorsement, waiver or exemption. Arkansas, Colorado, Michigan, Minnesota, Nebraska and Oregon waived the written examination for those candidates presenting basic science certificates from other states, while the boards in Iowa, Tennessee and Wisconsin exempted from examination those candidates who had been examined in the basic sciences by professional boards. The District of Columbia certified without examination diplomates of the National Board of Medical Examiners. Among the states mentioned, the National Board examination was also acceptable to the boards in Arkansas, Colorado, Iowa, Minnesota and Tennessee. These ten states issued 310 certificates without examination, and the boards of all states granted 2,065 certificates after examination.

TABLE 31.—*Certificates Issued by Examination, Reciprocity and Endorsement, 1944*

	Examination					Reciprocity, Endorsement or Waiver					
	Physicians and Medical Students	Osteopaths	Chiropractors	Unclassified	Totals	Physicians and Medical Students	Osteopaths	Chiropractors	Unclassified	Totals	Registered
Arizona	19	0	0	2	21	0	0	0	0	0	21
Arkansas	6	0	0	0	6	6	0	0	0	6	12
Colorado	110	2	0	8	120	25	7	0	3	35	155
Connecticut	76	1	0	0	77	0	0	0	0	0	77
District of Columbia	11	0	0	0	11	36	0	0	0	36	47
Florida	173	10	3	3	189	0	0	0	0	0	189
Iowa	125	12	0	72	209	7	2	0	3	12	221
Michigan	280	5	0	25	310	6	7	0	6	19	329
Minnesota	236	11	0	21	268	45	0	0	6	51	319
Nebraska	122	0	0	14	136	8	0	0	0	8	144
New Mexico	2	4	0	0	6	0	0	0	0	0	6
Oklahoma	71	0	0	0	71	0	0	0	0	0	71
Oregon	72	6	0	3	81	12	9	0	14	35	116
Rhode Island	35	1	2	22	60	0	0	0	0	0	60
South Dakota	9	1	0	0	10	0	0	0	0	0	10
Tennessee	215	0	0	12	227	44	0	0	2	46	273
Washington	131	6	0	0	137	0	0	0	0	0	137
Wisconsin	97	0	0	29	126	33	12	0	17	62	188
Totals	1,790	59	5	211	2,065	222	37	0	51	310	2,375

The figures for Arizona in table 31 do not agree with the previous table discussed, since a number of those examined were issued their certificates in 1945 and will be included in the next annual compilation of basic science tests. Likewise, in Arkansas the majority of those examined were medical students and will receive their certificates on the completion of their medical training.

TABLE 32.—*Total Candidates, 1927-1944*

		Physicians and Medical Students						Other Practitioners					
	No. of Boards	Examined	Passed	Failed	Percentage Failed	Endorsement	Total Certified	Examined	Passed	Failed	Percentage Failed	Endorsement	Total Certified
1927	5	305	279	26	8.5	26	305	22	15	7	31.8	1	16
1928	5	646	586	60	9.3	19	605	59	31	28	47.5	0	31
1929	7	668	610	58	8.7	75	685	66	31	35	53.0	0	31
1930	7	685	606	79	11.5	118	724	78	30	48	61.5	4	34
1931	7	680	586	94	13.8	141	727	107	48	59	55.1	0	48
1932	7	657	590	67	10.2	106	696	78	44	34	43.6	12	56
1933	8	601	527	74	12.3	121	648	60	30	30	50.0	10	40
1934	9	815	725	90	11.0	127	852	51	26	25	49.0	11	37
1935	10	882	761	121	13.7	110	871	74	33	41	55.4	4	37
1936	10	1,032	891	141	13.7	230	1,121	66	26	40	60.6	13	39
1937	12	1,231	1,061	170	13.8	192	1,253	113	41	72	63.7	10	51
1938	12	1,168	1,026	142	12.2	267	1,293	158	70	88	55.7	26	96
1939	14	1,141	1,013	128	11.2	727	1,740	218	97	121	55.5	294	391
1940	16	1,303	1,140	163	12.5	324	1,464	280	153	127	43.9	22	175
1941	17	1,768	1,560	208	11.8	280	1,840	356	191	165	46.3	73	264
1942	17	1,725	1,476	249	14.4	213	1,689	497	249	248	49.9	91	340
1943	18	2,330	2,098	232	10.0	296	2,394	389	211	178	45.8	80	297
1944	18	2,284	1,868	416	18.2	222	2,012	465	276	189	40.6	88	363
Totals		19,921	17,403	2,518	12.6	3,594	20,919	3,137	1,602	1,535	48.9	745	2,346

The number of successful applicants (2,375) registered by examination, reciprocity, endorsement, waiver or exemption are recorded in table 31. Among the successful candidates were 2,012 physicians, 96 osteopaths, 5 chiropractors and 262 unclassified persons. Wisconsin certified 62 without examination—the greatest number, of whom 33 were physicians, 12 osteopaths and 17 unclassified. No state certified a chiropractor without examination, and five states certified osteopaths without examination.

Altogether, 2,375 candidates received basic science certificates in seventeen states and the District of Columbia in 1944, ranging from 6 in New Mexico to 329 in Michigan.

In table 32 is included the number of candidates examined and certified by basic science boards for each year since and including 1927. In 1928, when five boards were functioning, there were 646 physicians examined, of whom 9.3 per cent failed and 59 other practitioners, of whom 47.5 per cent failed. By comparison, in 1944 the eighteen boards in operation examined 2,284 physicians, of whom 18.2 per cent failed and 465 other practitioners, with 40.6 per cent failures.

In the eighteen year period 19,921 physicians and medical students were examined, of whom 17,403 were successful in these examinations. In the same period 3,137 other practitioners took the test and 1,602 were successful. Of the physicians or medical students examined during these years, 12.6 per cent failed and 48.9 per cent of the other practitioners were unsuccessful. There were in this same period 3,594 physicians and 745 others certified without examination

In eighteen years 23,265 certificates have been granted by basic science boards. These certificates were awarded to 20,919 physicians and medical students and 2,346 other practitioners.

There was created a basic science examining board in Virginia in 1944 to consist of three members appointed by the governor from the faculties of the accredited colleges and universities of the state. None of the members may be a practitioner of any branch of the healing art. The board will cease to function July 1, 1949. It was created solely to examine a group of naturopaths and chiropractors who were practicing in the state without benefit of license during the twelve month period prior to July 1, 1944. Such practitioners must within the five year period either pass an examination given by this board in anatomy, bacteriology, elementary chemistry, pathology and physiology or must pass the examination given by the state board of medical examiners. The basic science board has no function whatever in connection with any other applicant for a license. An examination was scheduled by this board for 1944, but no candidate applied.

The basic science acts in two states were amended in 1945. In Arizona, the act was amended to provide that an applicant who is a citizen of the United States who furnishes proof of a certification, registration, or license issued to him "within any state or territory of the United States in which the requirements for the registration of said applicant at the date of issuance of his license shall be deemed by the board to be equivalent to those of Arizona, shall be eligible for registration by reciprocal endorsement at the discretion of the board." In Tennessee, the amendment in effect imposes a basic science requirement on osteopaths, chiropractors and naturopaths in addition to physicians. Theretofore only the last group named was required to take the examination.

The principle of basic science legislation is to provide a means of insuring that all who seek licensure to care for sick and injured persons shall first possess a reasonable knowledge of the sciences fundamental to the healing art. The enforcement of such laws affects mostly the group classified as "other practitioners." This is particularly significant when one takes into account that the testing of individuals for basic science registration is made by nonmedical examiners. The results demonstrate that, in general, practitioners other than regular physicians are poorly equipped in the fundamentals of medicine and should not be entrusted to care for the health of the people.

Efforts are being made by the American Association of Basic Science Boards to provide information based on experience to states contemplating new basic science board legislation and to develop procedures to facilitate reciprocity arrangements. In some instances basic science certification by reciprocity is unnecessarily difficult because of otherwise unimportant differences in the laws of the various states. The officers of the association are: president, Orin E. Madison, Ph.D., Michigan Board, Detroit; vice president, Charles D. Byrne, Ed.D., Oregon board, Eugene; secretary-treasurer, Ben H. Peterson, Iowa board, Cedar Rapids; executive committee, John S. Latta, Ph.D., Nebraska board, Omaha, and Rev. Nicholas H. Serror, O. P., Rhode Island board, Providence.

NATIONAL BOARD OF MEDICAL EXAMINERS

The certificate of the National Board of Medical Examiners is accepted as an adequate qualification for a medical license by the licensing authorities of forty-four states and the District of Columbia and by the territories and possessions of Alaska, Hawaii, Puerto Rico and the Canal Zone. At present Louisiana exempts diplomates of the National Board from the state examination if they have been licensed in some other state with which Louisiana reciprocates. The provisions of the medical practice laws or state board regulations of a few states are such that diplomates of the National Board are required to take an oral examination in Connecticut, Illinois, Maine, Rhode Island and Wyoming. A brief supplemental examination is required in Michigan. Illinois, Michigan, North Dakota, Pennsylvania and Washington require a rotating internship, while New Jersey recommends this type of service. The National Board certificate is not recognized by the licensing boards of Florida, Montana, Texas and Wisconsin. The states, territories and possessions which will endorse certificates of the National Board of Medical Examiners are recorded in table 33.

TABLE 33.—*States Endorsing Certificates of the National Board of Medical Examiners*

Alabama	Illinois	Nebraska	Puerto Rico
Alaska	Indiana	Nevada	Rhode Island
Arizona	Iowa	New Hampshire	South Carolina
Arkansas	Kansas	New Jersey	South Dakota
California	Kentucky	New Mexico	Tennessee
Canal Zone	Louisiana	New York	Utah
Colorado	Maine	North Carolina	Vermont
Connecticut	Maryland	North Dakota	Virginia
Delaware	Massachusetts	Ohio	Washington
Dist. of Columbia	Michigan	Oklahoma	West Virginia
Georgia	Minnesota	Oregon	Wyoming
Hawaii	Mississippi	Pennsylvania	
Idaho	Missouri		

The examinations of the National Board in the basic sciences are accepted in lieu of the examinations in those subjects given by the basic science boards of Connecticut, Iowa, Minnesota, Nebraska, New Mexico, Tennessee and the District of Columbia.

Diplomates of the National Board are admitted to the final examination of the Examining Board in England, the Triple Qualification Board of Scotland and the Conjoint Board of England. They are also granted recognition by the licensing bodies in Lebanon, South Africa, Spain and Turkey. Diplomates are also admitted without further examination to the Mayo Foundation (Graduate School of the University of Minnesota) and are exempt from some of the qualifications required by the United States Public Health Service.

Requirements for admission to the National Board examinations include a standard four year high school course, two years of acceptable college work including English, physics, chemistry, biology and a foreign language, and a medical education satisfactorily completed in an approved school in this country or Canada. Graduates of the university medical schools of Great Britain and Ireland are admitted to the examination provided these graduates have been licensed to practice in the country in which the school attended is located.

During the last few years there has been an increase in the number of medical schools that are using the

National Board's examinations as part of their own examination and promotion procedure. At some of the schools the students are required to pass part I at the end of the second year and part II at the end of the fourth year. Other schools require that part II be passed at the end of the fourth year. At one school all students are required to pass part I before graduation. Candidates who fail to pass the National Board examinations are given a supplemental examination at most schools. The schools that require practically all of their students to take the National Board's examinations under one plan or another are Albany, Boston, Buffalo, Duke, George Washington, Harvard, Long Island, New York Medical College, Tufts and Yale. In addition to the schools named there are a few others at which those students who voluntarily take and pass the National Board's examinations, either in part I or in part II, are excused from the corresponding final school examinations. This group of schools includes Colorado, Georgetown, Illinois, Loyola, Pennsylvania and Woman's Medical College.

Regarding this plan, the board states that "this practice places additional work and responsibility on the National Board of Medical Examiners. The board believes, however, that such use of its examinations is of definite value to the board because it necessitates that the examination be kept in close step with present medical education in this country. It appreciates the confidence in the fairness and thoroughness of its examinations that is implied by the substitution of the board's examinations for the former college comprehensive examination."

The first examination was given by the National Board in October 1916. From that date and up to and including a test held in June 1921, eleven examinations were held and 268 candidates were certified. The results of each examination during this period are given in table 34. These data, together with subsequent tabulations containing current figures, have been presented annually in THE JOURNAL for twenty-seven consecutive years and are based on official reports received periodically. This information is also included in the biographic file of physicians maintained by the American Medical Association.

Since 1922 the examination of the National Board has been divided into three separate parts which must be taken and completed in the following sequence: part I, consisting of a written examination in the basic sciences; part II, a written examination in five major clinical subjects, and part III, a clinical and practical examination in six major clinical divisions and their component subjects or subdivisions.

The tables that are presented herewith enumerate the results of examinations in parts, I, II and III for each calendar year since 1922, including those who passed and failed examinations and those certified.

During 1944, four examinations were given in parts I and II in various approved medical schools. Examinations in part III are given under the direction of local subsidiary boards at times sufficiently frequent to accommodate all eligible candidates. Such boards have been organized for this purpose in twenty-four centers.

TABLE 34.—*Examinations, 1916-1921*

Date	Total Examined	Failed	Percentage Failed
October 1916	10	5	50.0
June 1917	12	3	25.0
October 1917	28	6	21.4
January 1918	20	2	10.0
April 1918	23	5	21.7
December 1918	16	1	6.3
June 1919	52	1	1.9
February 1920	48	12	25.0
May 1920	60	14	23.3
February 1921	16	5	31.3
June 1921	40	3	7.5
Totals	325	57	17.5

TABLE 35.—*Examinations in Part I in 1944 and in the Years 1922 - 1944*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
January 1944	1,231	637	433	161	13.1
May	758	471	202	85	11.2
August	843	395	376	72	8.5
November	1,396	823	453	120	8.6
Totals	4,228	2,326	1,464	438	10.4
1922	388	263	58	67	20.3
1923	507	349	77	81	18.8
1924	591	415	69	107	20.5
1925	608	400	50	158	28.3
1926	625	436	104	85	16.3
1927	702	452	159	91	16.8
1928	843	533	231	79	12.9
1929	1,006	675	331	90	11.8
1930	1,260	801	345	114	12.5
1931	1,277	755	425	97	11.4
1932	1,307	847	371	89	9.5
1933	1,234	782	316	136	14.8
1934	1,241	809	347	85	9.5
1935	1,264	785	410	69	8.1
1936	1,344	858	363	123	12.5
1937	1,435	871	415	149	14.6
1938	1,654	986	508	160	15.0
1939	1,733	1,048	460	225	17.7
1940	1,653	1,069	375	209	16.4
1941	1,640	1,087	346	207	16.0
1942	1,866	1,203	471	192	13.8
1943	2,656	1,441	962	253	14.9
1944	4,228	2,326	1,464	438	10.4
Totals	31,152	19,191	8,657	3,304	10.6

TABLE 36.—*Examinations in Part II in 1944 and in the Years 1922 - 1944*

Date	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
January 1944	124	120	0	4	3.2
May	147	137	0	10	6.8
August	1,004	968	0	36	3.6
November	129	124	0	5	3.9
Totals	1,404	1,349	0	55	3.9
1922	109	90	0	19	17.4
1923	192	170	2	20	10.5
1924	267	227	0	40	15.0
1925	342	309	0	33	9.6
1926	381	334	1	46	12.1
1927	361	314	1	46	12.8
1928	410	371	1	38	9.3
1929	465	399	19	47	10.5
1930	620	543	7	70	11.4
1931	719	630	2	87	12.1
1932	732	674	0	58	7.9
1933	714	651	0	63	8.8
1934	633	583	0	50	7.9
1935	689	620	0	69	10.0
1936	768	716	2	50	6.5
1937	855	803	1	51	6.0
1938	861	815	0	46	5.3
1939	938	884	0	54	5.8
1940	1,028	963	9	56	5.5
1941	1,001	954	1	46	4.6
1942	1,072	1,031	0	41	3.8
1943	1,859	1,803	0	56	3.0
1944	1,404	1,349	0	55	3.9
Totals	16,420	15,233	46	1,141	6.9

A candidate is eligible for part I who has completed successfully the first two years of the medical course. An incomplete examination is allowed candidates at the end of their second medical year in schools whose third year curriculums include courses in one or two subjects of this part. These subjects may be taken at any examination period after the candidate has completed them in his medical school. They are recorded in these statistics under the heading "Incomplete Examinations."

A candidate is eligible for part II who has completed his four year medical course and has already passed part I.

The figures in tables 35, 36 and 37 cover details of each examination given during 1944 and include some who fail and are reexamined during the same year and those who pass parts I and II in the same year. They represent, therefore, examinations conducted and not individuals examined.

TABLE 37.—*Examinations in Part III, 1922-1944*

	Total Examinations	Passed	Failed	Percentage Failed
1922	22	22	0	0.0
1923	82	81	1	1.2
1924	126	120	6	4.8
1925	219	206	13	5.9
1926	255	243	12	4.7
1927	293	272	21	7.2
1928	322	306	16	5.0
1929	352	337	15	4.3
1930	420	401	19	4.5
1931	437	419	18	4.1
1932	550	522	28	5.1
1933	551	526	25	4.5
1934	567	548	19	3.4
1935	598	578	20	3.3
1936	576	547	29	5.0
1937	668	630	38	5.7
1938	706	682	24	3.4
1939	770	729	41	5.3
1940	791	770	21	2.7
1941	910	885	25	2.7
1942	1,053	1,040	13	1.2
1943	1,230	1,213	17	1.4
1944	1,166	1,145	21	1.8
Totals	12,664	12,222	442	3.5

During the year 1944, 4,228 examinations were given in part I; 2,326 were passed and 438, or 10.4 per cent, failed. During 1944 also 1,464 incomplete examinations were given. In part II, 1,404 were given. Fifty-five of this number, 3.9 per cent, were failures. Incomplete examinations are only rarely given in part II. There were none last year.

Since 1922 a total of 31,152 examinations have been given in part I and 16,420 in part II: During this period 19,191 candidates passed part I and 15,233 passed part II. In twenty-three years there have been 3,304 failures in part I, 10.6 per cent, and 1,141 failures in part II, 6.9 per cent. Since the medical schools have been operating on the accelerated plan, candidates taking the examinations of the National Board have greatly increased since 1942. In 1944 the examinations given exceeded the figure for the previous year by 1,572, while in 1943 the number of part II examinations given were in excess of the previous year; those given in 1944 decreased. This variance is again due to the accelerated curriculum.

Part III, the final examination of the National Board, is given when the candidate has received the M.D. degree and has satisfactorily completed an internship in a hospital approved by the Council on Medical Education and Hospitals of the American Medical Association or by the Canadian Medical Association or has served in a laboratory acceptable to the National Board. During the war period candidates may take part III after nine months of internship, but their certificates will be withheld until three additional months have been served as a hospital intern or resident or on active duty in the medical department of the armed forces. In 1944, 1,166 examinations were given, twenty-one of which (1.8 per cent) were unsuccessful tests. Results of examinations in this part during twenty-three years are given in table 37 and indicate that 12,664 were tested, of whom 12,222 were granted certificates. The percentage of

TABLE 38.—*Parts I, II and III, Excluding Duplications, 1922-1944*

	Total Examinations	Passed	Incomplete	Failed	Percentage Failed
1922	525	381	58	86	18.4
1923	775	594	79	102	14.7
1924	978	756	69	153	16.8
1925	1,167	915	50	202	18.1
1926	1,161	930	105	126	11.9
1927	1,248	947	142	159	14.4
1928	1,430	1,101	211	118	9.7
1929	1,723	1,280	319	124	8.8
1930	2,044	1,547	322	175	10.2
1931	2,218	1,632	410	176	9.7
1932	2,342	1,850	355	137	6.9
1933	2,277	1,806	280	191	9.6
1934	2,261	1,801	330	130	6.7
1935	2,368	1,831	408	129	6.6
1936	2,517	1,989	353	175	8.1
1937	2,735	2,151	397	187	8.0
1938	2,992	2,308	493	191	7.6
1939	3,221	2,476	443	302	10.9
1940	3,188	2,597	363	228	8.1
1941	3,318	2,749	332	237	7.9
1942	3,607	3,014	391	202	6.3
1943	4,513	3,670	606	237	6.1
1944	5,363	4,235	759	369	6.9
Totals	53,971	42,560	7,275	4,136	7.7

TABLE 39.—*Diplomates from Individual Medical Schools, 1944*

Univ. of Arkansas	1	Long Island Coll. of Med.	32
Coll. of Med. Evangelists	31	N. Y. Med. Coll.	106
Stanford Univ.	1	New York Univ.	83
Univ. of California	1	Syracuse Univ.	19
Univ. of So. California	1	Univ. of Buffalo	109
Univ. of Colorado	1	Univ. of Rochester	28
Yale Univ.	47	Bowman-Gray Sch. of Med.	1
George Washington Univ.	45	Duke Univ.	56
Georgetown Univ.	22	Univ. of Cincinnati	6
Loyola Univ.	1	Western Reserve Univ.	1
Northwestern Univ.	8	Univ. of Oregon	3
Univ. of Chicago	5	Hahnemann Med. Coll.	4
Univ. of Illinois	3	Jefferson Med. Coll.	3
State Univ. of Iowa	18	Temple Univ.	9
Univ. of Louisville	7	Univ. of Pennsylvania	14
Louisiana State Univ.	1	Woman's Med. Coll.	8
Johns Hopkins Univ.	11	Meharry Med. Coll.	3
Univ. of Maryland	3	Baylor Univ.	1
Boston Univ.	50	Univ. of Vermont	22
Harvard Med. School	92	Med. Coll. of Virginia	2
Tufts Coll. Med. School	65	Univ. of Virginia	2
Univ. of Michigan	5	Marquette Univ.	2
Univ. of Minnesota	4	McGill Univ.	7
St. Louis Univ.	6	Univ. of Toronto	2
Washington Univ.	10	Univ. of Western Ontario	1
Creighton Univ.	5	Extinct medical school	1
Univ. of Nebraska	1	Foreign	20
Albany Med. Coll.	47		
Columbia Univ.	66	Total	1,145
Cornell Univ.	42		

failures in 23 years was 3.5. Since the inception of the National Board in 1916, 12,490 certificates have been awarded.

Physicians who earn the certificate are designated diplomates of the National Board and are privileged to use the designating initials D.N.B.

The figures thus far presented represent examinations given. The number of individuals tested during any one year is recorded for the twenty-three year period in table 38. The classification of "Passed" or "Failed" in cases in which more than one examination has been taken in a given year was based on the results of the last examination during the year in question. For example, if in 1944 a candidate passed part I but later in 1944 failed part II he is computed in the tabulation as having failed. On this basis figures computed indicate that there were 5,363 who took at least one of the tests of the National Board in 1944, as compared with 525 in 1922. The trend has been steadily upward, and last year the number of candidates was 850 greater than in the previous year. In all, 53,971 individuals were examined in one or more of the annual examinations in the twenty-three years shown, of whom 42,560 passed, 7,275 took incomplete examinations and 4,136, or 7.7 per cent, failed.

TABLE 40.—*Licenses Granted on the Basis of National Board Certificates, 1944*

Alabama	2	Nebraska	1
Arizona	3	Nevada	1
Arkansas	1	New Hampshire	10
California	56	New Jersey	50
Colorado	3	New Mexico	2
Connecticut	29	New York	259
District of Columbia	19	North Carolina	13
Georgia	8	Ohio	13
Idaho	2	Oklahoma	2
Illinois	18	Oregon	5
Indiana	4	Pennsylvania	21
Iowa	5	Rhode Island	8
Kentucky	1	South Carolina	1
Maine	6	Tennessee	6
Maryland	12	Utah	4
Massachusetts	93	Vermont	7
Michigan	14	Virginia	2
Minnesota	11	Washington	11
Mississippi	2	West Virginia	4
Missouri	11	Puerto Rico	2
Total			702

The 1,145 physicians certified as diplomates last year represented graduates (table 39) from fifty-two existing and one extinct medical school in the United States, three in Canada and 20 graduates of faculties of medicine abroad. A few of these foreign graduates were diplomates from medical schools in continental Europe who had registered before the National Board discontinued admitting graduates of these schools.

Diplomates licensed to practice medicine on the basis of their credentials increased from 2 in 1917 to 702 in 1944, and 8,925 have been so licensed since the National Board was formed. However, 12,490 have received the certificate of the board. It would appear that 3,565 have not used the credentials as a licensing medium. In 1944 diplomates were granted licenses to practice medicine on the basis of their credentials in thirty-eight states the District of Columbia and Puerto Rico. The number so registered in each state is reported in table 40.

EXAMINING BOARDS IN THE MEDICAL SPECIALTIES

On authorization of the House of Delegates of the American Medical Association, the Council on Medical Education and Hospitals in 1933 formulated minimal standards deemed essential for certification as a specialist. At that time there were five examining boards in the medical specialties functioning: pediatrics, dermatology and syphilology, obstetrics and gynecology, ophthalmology and otolaryngology. Other boards were later organized, and since 1940 fifteen boards have been in operation. These boards are fully approved by the Council.

In addition to regulations relating to the organization and operation of specialty boards, the Council's "Essentials of Approved Examining Boards in Medical Specialties" contains also the minimum qualifications deemed necessary for certification as a specialist. Such qualifications include graduation from an approved medical school, completion of an internship in a hospital approved by the Council, and a period of specialized training in a selected specialty. Each board publishes a booklet containing a brief statement regarding its organization, personnel, purposes and requirements for certification. A statement of these requirements for each board was given in detail in the 1942 Educational Number of THE JOURNAL. Only a few minor changes have been made by some of the boards since these regulations were published in 1942.

The Advisory Board for Medical Specialties was organized in 1933-1934 to coordinate graduate education and certification of medical specialists in the United States and Canada. This board reports directly to its member groups and functions in close collaboration with the Council on Medical Education and Hospitals of the American Medical Association.

The majority of the boards will grant some credit for military service which will compensate in part for the interruption of the graduate training of physicians by military exigencies. The policies adopted by the boards vary. One grants an indefinite amount of credit, to be determined by an evaluation of the experience of individual applicants. Another grants full credit for work done in the surgical division of a regularly constituted Army or Navy hospital. Most boards limit the credit allowed to one year of training and/or one year of experience. The special provisions for military credit made by each board were published in the 1943 Educational Number of THE JOURNAL.

Prospective applicants who are in military services should obtain the booklet entitled "Record of Professional Assignments for Prospective Applicants for Certification by Specialty Boards" from the secretary of the board in the specialty desired. This booklet describes procedures pertaining to military credit and will enable the candidate to keep an accurate account of work done in military service duly certified and will constitute part of the credentials to be submitted on application for certification. One board, the American Board of Internal Medicine, under the direction of Col. William S. Middleton, is conducting special examinations for certification in the European theater of war.

The 9-9-9 program curtails the number of physicians desiring specialty certification. Under this wartime program the various boards will probably allow credit for the actual time spent by the candidate in house officer training in approved hospitals.

Two boards certify candidates in subspecialties. The American Board of Internal Medicine certifies in allergy, cardiovascular disease, gastroenterology and tuberculosis. Similarly the American Board of Surgery certifies specialists in proctology. Regular board certification is a prerequisite for certification in the subspecialty.

A list of the specialty boards and their officers and the number of certificates awarded prior to March 30, 1944 and the number certified until March 1, 1945 respectively appear in table 41. On March 30, 1944 there were 23,444 physicians certified by the fifteen boards and in the following year 1,308 were certified. Up to March 1, 1945 a total of 24,752 certificates had been issued. Included in these figures are 764 who had been certified in the subspecialties mentioned, namely allergy 75, cardiovascular disease 325, gastroenterology 157, proctology 71 and tuberculosis 136.

The greatest number in any one specialty thus far certified were in otolaryngology. In this specialty 3,848 have received the board's certificate since its organization in 1924. The board in ophthalmology, organized in 1917 and the oldest board in existence, has to date certified 2,437 individuals. In the major specialties of general medicine and general surgery, 3,541 and 2,499 respectively have received the certificate of these boards.

A key number has been assigned to each approved board, such as A.B. 1, and the biographic records of physicians published in the American Medical Directory includes by these means reference to those certified by the boards.

The Council on Medical Education and Hospitals works in close collaboration with the various specialty boards in the approval of residencies acceptable for certification. In most instances the Council inspects and evaluates new residencies and approves residency programs jointly with the specialty boards. This program has been established so that approved services may be equally acceptable to the Council and to the respective specialty boards.

There are indications [4] that over 12,000 medical officers will seek specialty certification after the war. The Council, working with specialty boards, hospitals, medical schools and the Committee on Postwar Medical Service, has made notable progress in meeting these educational needs of the future in the advanced training of specialists.

The Council on Medical Education and Hospitals and representatives of the various boards, and the Advisory Board for Medical Specialties, annually hold a joint session for the interchange of ideas and the discussion of problems of mutual interest. These meetings have proved to be worthwhile contributions to the improvement of medical education and medical practice in this country.

TABLE 41.—*Approved Examining Boards in Medical Specialties*

Key No.	Name of Board	Year of Incorporation	Total Certificates Awarded to March 30, 1944	Total Certificates Awarded to March 1, 1945
A.B. 1.	American Board of Pediatrics..... Pres., Edward B. Shaw, 384 Post St., San Francisco Sec., C. A. Aldrich, 115½ First Ave. S. W., Rochester, Minn.	1933	2,220	2,318
A.B. 2.	American Board of Psychiatry and Neurology ..... Pres., Hans A. Reese, Wisconsin Psychiatric Institute, Madison Sec., Walter Freeman, 1028 Connecticut Ave. N. W., Washington, D. C.	1934	1,716	1,809
A.B. 3.	American Board of Orthopaedic Surgery ..... Pres., Frank D. Dickson, 1400 Professional Bldg., Kansas City, Mo. Sec., Guy A. Caldwell, 3503 Prytania St., New Orleans	1934	800	896
A.B. 4.	American Board of Dermatology and Syphilology ..... Pres., Howard Fox, 140 E. 54th St., New York City Sec., George M. Lewis, 66 E. 66th St., New York City	1932	680	710
A.B. 5.	American Board of Radiology..... Pres., John W. Pierson, 1107 St. Paul St., Baltimore Sec., Byrl R. Kirklin, 102-110 Second Ave. S. W., Rochester, Minn.	1934	2,012	2,095
A.B. 6.	American Board of Urology..... Pres., Herman L. Kretschmer, 122 S. Michigan Ave., Chicago Sec., Gilbert J. Thomas, 1409 Willow St., Minneapolis	1935	983	1,018
A.B. 7.	American Board of Obstetrics and Gynecology ..... Pres., W. T. Dannreuther, 580 Park Ave., New York City Sec., Paul Titus, 1015 Highland Bldg., Pittsburgh	1930	1,764	1,871
A.B. 8.	American Board of Internal Medicine ..... Chairman, Reginald Fitz, 319 Longwood Ave., Boston Asst. Sec., W. A. Werrell, 1301 University Ave., Madison, Wis.	1936	3,263	3,541
A.B. 9.	American Board of Pathology..... Pres., Arthur H. Sanford, 102 Second Ave. S. W., Rochester, Minn. Sec., F. W. Hartman, Henry Ford Hospital, Detroit	1936	984	1,047
A.B. 10.	American Board of Ophthalmology Chairman, John Green, 3720 Washington Blvd., St. Louis Sec., S. Judd Beach, 56 Ivie Rd., Cape Cottage, Me.	1917	2,336	2,437
A.B. 11.	Americaan Board of Otolaryngology ..... Pres., Harris P. Mosher, 127 Front St., Marblehead Mass. Sec., Dean M. Lierle, University Hospital, Iowa City	1924	3,737	3,848
A.B. 12.	American Board of Surgery..... Chairman, Arthur W. Elting, 119 Washington Ave., Albany, N. Y. Sec., J. S. Rodman, 225 S. 15th St., Philadelphia	1937	2,349	2,499
A.B. 13.	American Board of Anesthesiology Pres., H. Boyd Stewart, 27th Place, Tulsa, Okla. Sec., Paul M. Wood, 745 Fifth Ave., New York City	1938	231	249
A.B. 14.	Americaan Board of Plastic Surgery ..... Chairman, John S. Davis, 135 E. 65th St., Baltimore Sec., James B. Brown, 400 Metropolitan Bldg., St. Louis	1937	160	161
A.B. 15.	American Board of Neurological Surgery ..... Chairman, Howard C. Naffziger, 384 Post St., San Francisco Sec., Paul C. Bucy, 912 S. Wood St., Chicago	1940	149	163
	Advisory Board for Medical Specialties Pres., Paul Titus, 1015 Highland Bldg., Pittsburgh Sec., Byrl R. Kirklin, 102-110 Second Ave. S. W., Rochester, Minn.			
	Totals.....		23,444	24,752

Certification in the subspecialties: By the American Board of Internal Medicine: allergy 75, cardiovascular disease 325, gastroenterology 157, tuberculosis 136, total 693. By the American Board of Surgery: proctology 71. Total certified in the subspecialties, 764. These figures are included in the above tabulation.

4. J. A. M. A. **127:** 759-770 (March 31) 1945.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street - - Chicago 10, Ill.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Eight dollars per annum in advance

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SATURDAY, MAY 12, 1945

MEDICAL LICENSURE

In this state board number the Council on Medical Education and Hospitals presents the forty-third annual compilation of data on medical licensure (pp. 101-129). These valuable statistics, covering the calendar year 1944, are widely used by medical schools, licensing and examining bodies, government agencies, medical educators, students and physicians. They were compiled with the generous cooperation of medical and basic science examining boards in the United States, territories and possessions, the National Board of Medical Examiners, the various American boards in the specialties and other agencies. The Council and THE JOURNAL greatly appreciate the cooperation of these agencies in making available this material. Besides publication in THE JOURNAL, a reprint edition is available and given wide circulation. Reprints of certain separate tables are also made and assist the Council in replying to the annual thousands of requests for information on licensure and related subjects.

Primarily as a result of the accelerated program there were 1,211 more licenses issued in 1944 than in the previous year. Of the 9,606 physicians licensed, many previously held licenses elsewhere; 6,933 were licensed for the first time and represent additions to the profession. This is the largest number added to the profession for many years, including the years 1936 to 1941, when large numbers of foreign graduates were licensed and added to the profession in this country. The number of foreign graduates licensed was fewer than at any other time since 1935.

The inadequacy of the educational programs of unapproved schools is clearly reflected in an analysis of failures in licensing examinations. Failures exceeded 45 per cent among the graduates of unapproved medical and osteopathic schools examined by medical examining boards. Approved medical schools had less than 3 per cent failures.

THE NATURE OF ANIMAL VIRUSES

In medical literature the word virus is now used in a special sense to designate certain agents of infectious disease that are not subject to successful study by the usual bacteriologic procedures. The nature and properties of viruses so designated cannot be determined by the morphologic and cultural methods applied with such momentous results to bacteria. Viruses cannot be seen with the light microscope and so far they have not been cultivated outside of living tissue. Scarcely more than a decade ago they were demonstrable only by their power to cause disease. Special and new methods were required to gain some closer insight into their nature and properties. Recent and current results of intensive work with newer methods at Duke University are reviewed by Beard,[1] with special reference to the viruses of vaccinia, equine encephalomyelitis, influenza and rabbit papilloma. By means of air driven, analytical centrifugation of virus infected materials, the viruses just mentioned may be obtained in sufficiently pure forms for study of their chemical and electron micrographic properties. It concerns "complex structures comprised of protein, lipid and nucleic acid." The simplest in composition is the papilloma virus, which appears to be essentially nucleoprotein. There are indications that the vaccinia and influenza viruses are surrounded by semipermeable membranes. The electron microscope is yielding surprising information of the greatest significance with regard to the size, shape and internal structure of the particles of these viruses. Of special interest is the unmistakable differentiation within particles.

These advances in the knowledge of the properties of the animal viruses studied, barely indicated in the foregoing but presented clearly and in detail by Beard, have forced him to abandon his advocacy of the molecular hypothesis of the nature of viruses. The results of the work with the products of the ultracentrifuge do not support the molecular assumption. "The images of the animal virus particles in electron micrographs indicate morphologic characters of the agents obviously similar to those of the relatively highly organized bacteria." But whether viruses are all of the same nature remains to be determined.

Now that purified viruses can be obtained for chemical and physical studies, for biologic experiments and for morphologic examination with the electron microscope, continued work on their nature and on virus diseases, e. g. infantile paralysis, promises results of great significance.

1. Beard, Joseph W.: The Ultracentrifugal, Chemical and Electron Micrographic Characters of Purified Animal Viruses, Proc. Inst. Med. Chicago **15**: 294, 1945.

HEARINGS ON THE ELLENDER BILL

The Senate Committee on Military Affairs conducted hearings on the Ellender bill (S. 637) on May 1. This bill (THE JOURNAL, March 10, p. 599) seeks to correct the present policies and regulations, which will either (1) reduce medical school freshmen enrolments materially in 1945 and drastically in 1946 or (2) result in the admission of inferior applicants by some schools. The measure provides for the deferment of qualified premedical students and the assignment of acceptable men in the armed forces to premedical and medical schools. The committee has not yet acted on the bill.

Medical education was represented at the hearings by Dr. Walter Bloedorn of the executive council of the Association of American Medical Colleges and Drs. Harvey Stone and Victor Johnson of the Council on Medical Education and Hospitals of the American Medical Association. There was no representation from the Procurement and Assignment Service, which had previously supported the measure.

A joint statement was made, giving the views of the American Medical Association and the Association of American Medical Colleges. The main outlines of this statement were endorsed by every medical school in the country except Columbia; it demonstrated that utterly inadequate numbers of qualified students will be available for admission to 1946 freshman medical classes. These must come from the following categories: women, men under 18 or physically disqualified and veterans. It will be fortunate if these groups will provide 2,000 qualified students, as compared with the normal admission of about 6,000. For example, a recent survey of eight large universities by Dr. Harold Diehl revealed that only 42 veterans were enrolled there as premedical students who would become available to medical schools before 1947. Of these about 28 were judged to be good material. Normally these eight universities provide 800 to 900 medical school freshmen annually.

The Army, the Navy and the Selective Service System opposed the bill, contending that the deferment of the few thousands involved would seriously hamper the war effort. The measure was also called unnecessary, since it was claimed that adequate numbers would be available without deferments. The opposition, especially General Hershey, repeatedly quoted Dr. Willard Rappleye; they illustrated contentions with Columbia's experiences and prospects as an example. In the critical months to come, the stronger and more favorably situated schools, including Columbia, will suffer least in reduced enrolments. Opposition by this school or its dean to a measure which all other schools believe to be necessary is an unjustifiable performance. Failure of this legislation will make it impossible to maintain enrolments at a level adequate to provide the country with physicians it needs. The action of Dr. Rappleye in lending his aid to the opposition can be characterized as one of reckless irresponsibility.

POLIOMYELITIS IN THIAMINE DEFICIENT MONKEYS

About three years ago it was shown by Foster and her associates [1] of the University of Pennsylvania that the resistance of mice to poliomyelitis virus is increased as a result of thiamine deficiency and that a similar though less pronounced increase in antiviral resistance results from other forms of malnutrition. Similar results were reported by Rasmussen and his associates [2] of the University of Wisconsin. On account of wartime interest in malnutritional immunity, Clark and his associates [3] of the University of Wisconsin have attempted to confirm these seemingly paradoxical results on monkeys.

As a preliminary to the attempted confirmation the Wisconsin biochemist [4] developed a synthetic diet for rhesus monkeys containing optimum amounts of all essential food elements. They found that the signs of mild thiamine deficiency in monkeys are cessation of normal growth, anorexia, apathy and an unkempt appearance. More serious thiamine deficiency is characterized by tremors, ptosis, muscular weakness, cachexia and temporary spastic paralyses. These symptoms are easily alleviated by tube feeding or by the intraperitoneal injection of an adequate amount of thiamine.

To date the immunologic effects of the milder type of thiamine deficiency have been tested on 40 monkeys (four groups of from 4 to 18 each) injected with poliomyelitis virus. Half of the members of each group were maintained on a thiamine deficient diet. Controls were given the optimum synthetic or natural diet. The first series (4 animals) was inoculated intracerebrally with the supernate from a 5 per cent suspension of infected spinal cord. Regardless of diet, all monkeys of this series succumbed to typical poliomyelitis (quadriplegia). There was no essential difference in the incubation period, severity of the symptoms or necropsy findings in the thiamine deficient and adequately fed animals.

In the three remaining groups (7 to 18 monkeys each) inoculation was made by repeated intranasal instillation of 1 cc. of the same supernate. All animals of these three series developed poliomyelitis. The symptoms and necropsy findings in the thiamine deficient monkeys tended to be slightly more severe than in the adequately fed controls. The Wisconsin bacteriologists conclude from these findings that, in contrast to the well confirmed increase in antiviral resistance in thiamine deficient mice, vitamin deficiency does not materially alter poliomyelitis susceptibility in monkeys.

1. Foster, Claire; Jones, J. H.; Henle, Werner, and Dorfman, Frieda: Proc. Soc. Exper. Biol. & Med. **51**: 215 (Nov.) 1942; J. Exper. Med. **79**: 221 (Feb.), **80**: 257 (Oct.) 1944.
2. Rasmussen, A. F., Jr.; Waisman, H. A.; Elvehjem, C. A., and Clark, P. F.: J. Infect. Dis. **74**: 41 (Jan.-Feb.) 1944.
3. Clark, P. F.; Waisman, H. A.; Lichstein, H. C., and Jones, E. S.: Proc. Soc. Exper. Biol. & Med. **58**: 42 (Jan.) 1945.
4. Waisman, H. A.; Rasmussen, A. F., Jr.; Elvehjem, C. A., and Clark, P. F.: J. Nutrition **26**: 205 (Aug.) 1943.

Current Comment

OLEOMARGARINE AND THE COUNCIL ON FOODS AND NUTRITION

Misinterpretation is being placed on the action of the Council on Foods and Nutrition in withdrawing acceptance from individual brands of oleomargarine. Reports published in the periodicals devoted to the interests of the dairy industry and comment stimulated in the public press falsely attribute this action to a lack of confidence in the nutritional value of margarine. Such is not the case. The report of the Council on Foods and Nutrition in THE JOURNAL, Sept. 16, 1944, stated clearly that margarine is considered a general purpose food and therefore outside the Council's scope of acceptance, now limited to "special purpose" foods. For this reason acceptance is no longer granted to margarine. Confidence in the nutritional value of margarine fortified with vitamin A was reaffirmed by the Council at the time acceptance was withdrawn. The attempts of those opposing margarine to cast doubt and suspicion on its food value as a result of the withdrawal of acceptance by the Council are unwarranted and misleading.

HAND BOOKBINDING AS OCCUPATIONAL THERAPY

A recent article on hand bookbinding, by Scheirer,[1] points out the interesting and valuable diversional activity of hand bookbinding in the army convalescent reconditioning program. This particular measure of occupational therapy requires considerable hand skill and facilitates the development of a calm mental atmosphere, which is recognized as having a soothing effect on nervous and irritable persons. The opportunity, the interest and the incentive for hand bookbinding in the occupational therapy program can be provided by instructors and occupational therapists who are willing to prepare food for the mind as well as work for the hands. The tools, materials and technics required are described in Scheirer's contribution.

DETERMINATION OF ALBUMIN AND GLOBULIN IN HUMAN SERUM

One of the limitations in the use of serum albumin and globulin values obtained by salt fractionation is the accuracy of the methods. While the salting out methods give reliable values in normal bloods the errors of the methods are largest in abnormal blood samples, where the clinical need is greatest. Pillemer and Hutchinson[1] recently proposed a method of determining the albumin and globulin content of human serum with the use of methyl alcohol as the reagent. They found that the globulin of human serum can be practically quantitatively precipitated by the addition of methyl alcohol in the cold at a controlled p_H. The albumin remains in solution. In addition they found that the albumin, globulin and the albumin globulin ratios obtained by this method agreed favorably with the values obtained on the same blood by the electrophoretic method. The methyl alcohol method does not require special equipment other than a cold room or an ice box. This accurate procedure is readily carried out and holds considerable promise as a tool in the investigation of blood protein concentration.

1. Scheirer, George A.: Some Notes on Hand Bookbinding—Forwarding, Occup. Therapy **23**: 332 (Dec.) 1944.

1. Pillemer, Louis, and Hutchinson, M. C.: J. Biol. Chem. **158**: 299 (March) 1945.

AN ADVERTISING BACKFIRE

Seldom have more earnest letters of protest been received in the headquarters office of the American Medical Association than have come in connection with an advertising technic for selling penicillin used during the third week in April by the Cheplin Laboratories, Inc., of Syracuse, N. Y. Apparently telegrams marked "urgent" were sent to the homes of physicians urging them to buy penicillin directly from this company. These telegrams were sent to the homes rather than to the offices of the physicians. In many homes where the telegrams were received sons, daughters and sometimes the father himself were abroad with the armed forces; the telegrams with the heading "urgent" struck consternation. At a time when private messages are so severely restricted, such as congratulations, messages of condolence and those concerning the usual affairs of life, this technic for promoting the sale of a drug would seem to be an infringement of the government's request to aid the war services by diminishing the burden on the telegraph agencies as much as possible. The question of good taste is even more conspicuous.

HYPERSENSITIVITY IN PERIARTERITIS NODOSA AND RHEUMATIC FEVER

In a recent lecture before the Institute of Medicine of Chicago, Rich[1] discussed the role of hypersensitivity in disease, particularly in periarteritis nodosa and rheumatic fever. Widespread periarteritis nodosa was found by him in patients with pneumonia who died after treatment with antipneumococcus serum and a sulfonamide drug, singly or combined. The evidence pointed to the production of periarteritis nodosa by hypersensitive reactions of the serum sickness type induced by the foreign serum or by sulfonamides. Rich has shown that typical periarteritis nodosa may develop in experimental serum disease of rabbits following the injections of large amounts of foreign serum, but the animal has not been rendered hypersensitive to sulfonamides, possibly because the drug does not unite with rabbit plasma protein to form an abnormal antigenic molecule. From clinical observations we have learned that in human beings sulfonamides may act as powerful sensitizers. Rich states that since the introduction of sulfonamides in 1936 there has been an increase in the number

1. Rich, A. R.: The Role of Hypersensitivity in the Pathogenesis of Rheumatic Fever and Periarteritis Nodosa, Proc. Inst. Med. Chicago **15**: 270 (March) 1945.

of cases of periarteritis nodosa coming to necropsy in the Johns Hopkins Hospital. He cautions against the ungoverned use of sulfonamides for minor ailments and urges that patients under sulfonamide treatment be watched carefully so that the drug may be discontinued immediately on the first appearance of symptoms of hypersensitiveness. Undoubtedly other forms of sensitization than by foreign serum and sulfonamides may result in periarteritis nodosa. Rich refers to the relationship that has been observed between this vascular disease and asthma. In every case of periarteritis earnest effort should be made "to determine the inciting antigen." In the course of his experiments on sensitized rabbits Rich found cardiac lesions which closely resembled those of rheumatic fever. The focal changes in the collagen of the connective tissue, the Aschoff body, the inflammatory lesions, the small foci of necrosis in the cardiac muscle, characteristic of rheumatic fever, were all found in rabbits subjected to reactions of the serum disease type. These facts support the view that the lesions of rheumatic fever result from reactions to antigen to which the body is sensitized. While the hemolytic streptococcus may be the most common source of the antigen, the possibility that other antigens may be concerned in some of the cases cannot now be excluded. It appears then that in periarteritis nodosa hypersensitivity plays a causative role, and there is good evidence that this is the case also with respect to lesions in rheumatic fever. There are indications, according to Rich, that hypersensitivity may be a factor in the genesis of rheumatoid arthritis, lupus erythematosus, certain forms of purpura and glomerulonephritis in some cases.

SIR THOMAS LEWIS

The death of Sir Thomas Lewis on March 17 ended a distinguished career highlighted by pioneer accomplishments in the application of scientific standards and methods to clinical practice. A mere recital of Lewis's achievements is impressive; his influence, however, rested largely on his use of the experimental method to analyze problems of the patient. Early interest and training in physiology and close friendship and association with James Mackenzie no doubt led Sir Thomas to the new science of electrocardiography. In vascular physiology Lewis and his colleagues elucidated the mechanism of Raynaud's disease, acrocyanosis, intermittent claudication and angina pectoris. Later he became interested in the mechanism of pain. Lewis, his colleagues and his students have contributed to the fundamental knowledge of physiology on which rational therapeutics is based. Throughout his life of active research Sir Thomas recognized the needs of the student and practitioner by contributing a number of exceptional books, most of them widely known in this country, including "Clinical Disorders of the Heart Beat," "Clinical Electrocardiography" and "Diseases of the Heart." He was editor of the medical periodical *Heart* from its founding in 1908 and of this journal's successor, *Clinical Science,* which in the change of names reflects Lewis's broad interests and physiologic approach to medical problems. The death of Sir Thomas Lewis is a loss to the medical world. His influence on methods of clinical research perhaps even more than his own accomplishments has made an indelible impression on medical science which will persist for decades.

INTRAVENOUS ALCOHOL ANESTHESIA AS USED IN RUSSIA

Verkhovskaya,[1] pointing out that alcohol, like chloroform and ether, belongs to those poisons which act by paralysis of the central nervous system, emphasizes that alcohol has the advantage over chloroform and ether that it is almost completely metabolized to carbon dioxide and water. In narcosis produced by administration of alcohol, sleep begins quickly and analgesia soon follows. The toxic dose of alcohol is 7.7 cc. per kilogram of body weight. The dose producing analgesia and sleep varies from 1.5 to 3.0 cc. Thus the difference between the toxic and the therapeutic dose is 4.7 to 5.2 cc. The margin of safety is considerably less for ether and chloroform. The difference between the toxic and therapeutic blood concentrations is 1.5 mg. for chloroform and 4 mg. for ether per hundred cubic centimeters. Two cc. of a 1 per cent solution of morphine is given to the fasting patient half an hour before the operation. Intravenous administration of 1 part of 95 per cent alcohol with 2 parts of 5 per cent glucose solution is started on the operating table. The average dose for complete narcosis is 2 to 2.5 cc. per kilogram of body weight. Thus a person weighing 60 Kg. requires 120 cc. of alcohol and 240 cc. of 5 per cent glucose solution. The mixture is prepared on the day of operation. The glucose solution is sterilized and the required amount of alcohol is added just before use. The standard apparatus for blood transfusion is utilized for the infusion, which is given slowly for fifteen to twenty minutes. When sleep sets in, the rubber tube is clamped to stop the infusion. The clamp is released if signs of awakening appear before the operation is finished, and the drip is resumed. When deep anesthesia has set in, the vein is flushed with 30 to 40 cc. of isotonic solution of sodium chloride to prevent possible thrombophlebitis. Sleep begins following the introduction of 40 to 60 cc. of alcohol. The stage of excitement is passed without difficulty and sleep sets in quickly. The conjunctivas, face and neck become red; the pupils contract and stop reacting to light. Respirations become even and steady and the pulse is of good volume. Sleep lasts from two to five hours. On awakening the patient is irrational and requires special observation. Thirty operations have been performed at an evacuation hospital under intravenous alcohol anesthesia. Complications noted were vomiting in 6 per cent of the cases, temporary retention of urine, transitory headache and the occasional appearance of albumin and flat epithelial cells in the urine, which disappeared in a few days; 20 to 30 red blood cells per high power field also were found. Verkhovskaya concludes that alcohol narcosis is an inexpensive method, devoid of the defects of some other methods of anesthesia.

1. Verkhovskaya, E. V.: Intravenous Alcohol Anesthesia, Am. Rev. Soviet Med., February 1945, p. 260.

MEDICINE AND THE WAR

ARMY

HARMON GENERAL HOSPITAL IS TROPICAL DISEASE CENTER

Harmon General Hospital, Longview, Texas, was recently designated for the treatment of tropical diseases. The only other army tropical disease center is Moore General Hospital, Swannanoa, N. C. Lieut. Col. Francis R. Dieuaide, chief of the Tropical Disease Branch, Medical Consultants Division, Office of the Surgeon General, stated that the medical staff of Harmon General Hospital has for some time been engaged in a study of relapsing malaria which has resulted in a permanent contribution to the knowledge of the disease. This study is now being extended to other tropical diseases which are rare in this country, such as filariasis, schistosomiasis and dysentery. Col. Gouveneur V. Emerson is commanding officer of Harmon General Hospital, Lieut. Col. Worth B. Daniels is chief of the medical service and Lieut. Col. Stuart W. Lippincott is chief of the laboratory division.

HEADS NEW DEPARTMENT AT SCHOOL OF AVIATION MEDICINE

Major R. Lee Clark, former fellow in surgery of the Mayo Foundation, was recently appointed director of the newly formulated Department of Surgery of the School of Aviation Medicine, Randolph Field, Texas. Major Clark, who was transferred to Randolph Field from Wright Field at Dayton, Ohio, was also appointed director of surgical research for the Army Air Forces. In addition to his new posts he will continue as the surgical consultant of the Army Air Forces for the Central District of the United States, which area includes Texas, Louisiana, Arkansas, Oklahoma, Colorado, Missouri, New Mexico, Iowa, Minnesota, North Dakota, South Dakota and Nebraska.

HOSPITAL SHIP NAMED FOR FRANCES Y. SLANGER

The U. S. A. H. S. *Frances Y. Slanger* will enter active service under the operation of the Transportation Corps in a short time and will be the largest and fastest American hospital ship afloat. It was formerly the Italian luxury liner *Saturnia*. Second Lieutenant Slanger, army nurse for whom the ship is named, was the seventh nurse to lose her life in this war and was the first American nurse to be killed in the European theater of operations.

TWINS IN THE ARMY MEDICAL CORPS

The military careers of Col. Ziba L. Henry and Lieut. Col. William H. Henry, twins in the Army Medical Corps, both of whom graduated from the Starling Medical College, Columbus, in 1903, illustrate the extent to which identical twins resemble each other.

Col. Ziba L. Henry was ordered to active duty in the Medical Reserve Corps in 1908 and continued on active duty until World War I started, when he was rapidly promoted to captain, major and lieutenant colonel. He was retired for age in 1936 as a lieutenant colonel but again assigned to active duty in 1941 and later promoted to colonel and was retired because of disability in 1943.

Lieut. Col. William H. Henry entered the Medical Corps as a first lieutenant early in 1917 just after the declaration of war. He was promoted to captain and major and served for four years as a major, with one year's service in England, France and Russia. He was discharged in December 1922 and appointed as major in the Reserve Corps and still later to lieutenant colonel, which rank he still holds.

Both were commissioned as majors in the Medical Corps of the Regular Army in 1920. Both served tours of duty in the Philippines. They graduated from literary and medical school at the same time and both did general practice for a number of years. They are identical twins and few except their intimate friends can tell them apart.

ARMY AWARDS AND COMMENDATIONS

Lieutenant Colonel Richard L. Meiling

Lieut. Col. Richard L. Meiling, formerly of Columbus, Ohio, was recently awarded the Legion of Merit "for services as air evacuation officer and executive officer, operations division, Office of the Air Surgeon, from Sept. 22, 1942 to July 11, 1944. Because of his thorough medical professional knowledge as well as his knowledge of air forces operations and organization, he was given the difficult and responsible assignment of preparing studies and plans for the organization of the first organized Air Evacuation Service. His enthusiasm, diplomacy and complete knowledge of his task enabled him to 'sell' this program to War Department chiefs of staff, theater commanders and our Allies. An ardent advocate of air evacuation, he has been ever active in the development of medical equipment peculiar to air evacuation. Today air evacuation squadrons are performing these duties in each theater of war. They have evacuated wounded from the South Pacific, Africa, Sicily, Italy and Normandy and in the Continental United States. Their contribution to the improvement of the morale of all personnel, as well as an aid to the tactical commander in the rapid evacuation of noneffectives, has proved to be of inestimable value in the prosecution of the war. His superior organizational ability and efficiency in the development of air evacuation of the Army Air Forces reflect the highest credit on himself and the armed forces of the United States." Dr. Meiling graduated from the Ludwig-Maximilians University Medical Faculty in 1937 and entered the service Oct. 7, 1940.

Lieutenant Colonel John D. Handley

The Bronze Star was recently awarded to Lieut. Col. John D. Handley, formerly of Hodgenville, Ky. The citation accompanying the award read "for meritorious service in connection with military operations against an enemy of the United States from July 20, 1944 to Dec. 20, 1944. Colonel Handley, serving as chief of medical service, 101st Evacuation Hospital, worked untiringly with approximately 12,000 patients passing through the hospital during the period named. His assignment of officers and men of his section resulted in most effective and frictionless institutional operation. Knowledge of latest standards of diagnosis and treatment left few instances requiring assistance from outside sources. Good humor and rare tact kept morale at high pitch in spite of fatigue and nervous tension due to long continued activity. Colonel Handley has displayed and exemplified the highest traditions of the Medical Department of the United States Army." Dr. Handley graduated from the University of Louisville School of Medicine in 1928 and entered the service June 12, 1942.

Colonel Ira V. Hiscock

Col. Ira V. Hiscock, officer in charge of the Public Health Section, Economics and Relief Branch of the Civil Affairs Division, was recently presented the Legion of Merit for his work in typhus control in liberated countries, particularly in Italy, from April 1943 to February 1945.

Colonel Hiscock was placed on inactive duty April 12 to become chairman of the Department of Public Health at Yale

University. He was professor of public health in the School of Medicine at Yale prior to entering the service.

The citation accompanying his award read:

"For exceptionally meritorious conduct in the performance of outstanding services from April 1943 to February 1945. As officer in charge of the Public Health Section, Economics and Relief Branch of the Civil Affairs Division, Colonel Hiscock with rare foresight and ability supervised all matters relating to health services, hospitals, medical services and sanitation pertaining to the civilian populations in liberated or occupied countries and acted as liaison between the Office of the Surgeon General and Civil Affairs Schools and the School of Military Government at Charlottesville, Va.

"His advice to the Civil Affairs Division on all medical matters within its jurisdiction and to the G-5 Division of the theaters of operation and tactical command headquarters, together with the prompt action taken by him, prevented the serious consequences which might have resulted from the dangers of disease to which our troops were exposed.

"The effectiveness and adequacy of the plans made and executed under Colonel Hiscock's supervision were demonstrated in the typhus outbreak that occurred in Naples. This community had been devastated by the enemy; the populace was suffering from malnutrition and was living in unspeakable filth without water and sewerage facilities and lacking elementary sanitary means of modern civilization; it was a potential breeding place for disease. Colonel Hiscock's plans to meet just such a contingency prevented what might have been a catastrophe. As an indelible tribute to his genius the records show that, of the thousands of troops stationed in and passing through the Naples area, not a single American soldier died of typhus."

Major Ralph H. Riegelman

The Bronze Star was recently awarded to Major Ralph H. Riegelman, formerly of Milwaukee, Wis., "for meritorious achievement as a group surgeon of a heavy bomb group and station surgeon of a station hospital in the North African and European theaters of operation from September 1942 to the present day. With no precedent to guide him and only limited personnel to work with, Major Riegelman established a most efficient station hospital to satisfy the many needs of an extensive combat operations program. By his diligence and devotion to duty he has successfully cared for the health of the group while operating from North Africa under adverse conditions. His skill, judgment, initiative, foresight and devotion to duty are most praiseworthy and reflect great credit on himself and the armed forces of the United States." Dr. Riegelman graduated from Marquette University School of Medicine, Milwaukee, in 1941 and entered the service in December 1940.

Captain Leo Lefkowitz

The Bronze Star was recently awarded to Capt. Leo Lefkowitz, formerly of Woodside, N. Y. The citation accompanying the award read "for meritorious service in connection with military operations against the enemy as orthopedic surgeon, 44th Evacuation Hospital, Semimobile, from June 19, 1944 to Dec. 4, 1944 in France and Belgium. Captain Lefkowitz performed numerous operations on all types of battle casualties with superior surgical skill and versatility. In many instances, after laboring for long periods of time in surgery, he voluntarily remained on duty to give expert postoperative care to his patients. By his untiring efforts and professional ability Captain Lefkowitz contributed materially to the success of his hospital, thus reflecting credit on himself and the military service." Dr. Lefkowitz graduated from Columbia University College of Physicians and Surgeons, New York, in 1924 and entered the service April 1, 1943.

Major Jay E. Tremaine

Posthumous award of the Bronze Star was recently made to Major Jay E. Tremaine, formerly of Ajo, Ariz., for "service from March 2 to Sept. 7, 1944. While at Lasang, Davao, Philippine Islands, he patiently and untiringly served American prisoners of war who were constantly in need of medical assistance. On board a prison ship, the men were crowded, starved and overheated, but his cheerful attitude and optimism encouraged them and inspired them with the will to survive. When the ship was torpedoed he lost his life. His courageous services in the face of almost unbearable conditions were an invaluable contribution to the welfare of his comrades." Dr. Tremaine graduated from Rush Medical College, Chicago, in 1930 and entered the service April 2, 1941. He was killed in action when the ship was sunk Sept. 7, 1944 off the Philippine Islands.

Colonel Lyle S. Powell

Col. Lyle S. Powell, formerly of Lawrence, Kan., and at present medical officer for a field headquarters of the Chinese Combat Command in south central China, was recently awarded the Bronze Star "for meritorious service." Dr. Powell also served overseas for two years in the first world war, serving first as commanding officer of the 99th Aero Squadron and later as group commander of the 99th and 104th squadrons. He was awarded the Legion of Honor with two stars. Dr. Powell graduated from the University of Nebraska College of Medicine, Omaha, in 1925 and entered the service Sept. 22, 1942.

Lieutenant Colonel Melvin F. Huth

A citation for the "efficient, rapid and uninterrupted support the medical battalion rendered the division during its rapid attack through the Vosges Mountains and its subsequent attack north across the German border" was recently awarded to Lieut. Col. Melvin F. Huth, formerly of Baraboo, Wis. Colonel Huth is commanding officer of the medical battalion which received the commendation for its ceaseless devotion to duty and care of the wounded. He graduated from the University of Wisconsin Medical School, Madison, in 1933 and entered the service in January 1941.

Major Howard A. Lowy

Major Howard A. Lowy, formerly of Creve Coeur, Ill., and now serving as assistant to the surgeon at the headquarters of the Chinese combat command near Kunming, was recently awarded the Presidential Unit Citation for his service with the India-China Wing of the Army Transport Corps and is also entitled to wear two bronze stars on his Asiatic-Pacific Campaign Ribbon, one for service in India and the other for service in China. Dr. Lowy graduated from the University of Illinois College of Medicine, Chicago, in 1940 and entered the service in October 1942.

Captain William H. Reiff

Capt. William H. Reiff, formerly of Oklahoma City, was recently awarded the Bronze Star "for meritorious service in connection with military operations against the enemy in France, Luxembourg, Belgium and Germany during the period July 3, 1944 to March 10, 1945." Dr. Reiff graduated from the University of Oklahoma School of Medicine, Oklahoma City, in 1941 and entered the service July 1, 1942.

Captain Fred J. Ansfield

Capt. Fred J. Ansfield, formerly of Glidden, Wis., was recently awarded the Silver Star and the Bronze Star. His division was awarded the Presidential Citation for superb fighting. Dr. Ansfield graduated from the University of Wisconsin Medical School, Madison, in 1933 and entered the service Oct. 29, 1942.

Major Edouard E. Lyon

The Soldier's Medal was recently awarded to Major Edouard E. Lyon, formerly of Toledo, for heroism. He rescued two soldiers from drowning when a landing craft overturned during a landing operation in the Southwest Pacific. Dr. Lyon graduated from Northwestern University Medical School, Chicago, in 1929 and entered the service Aug. 31, 1942.

Captain William W. Schildecker

Capt. William W. Schildecker, formerly of Pittsburgh and now with the 5th Army Ski Troops in the mountains of northern Italy, was recently awarded the Bronze Star and the Purple Heart. Dr. Schildecker graduated from the University of Pittsburgh School of Medicine, in 1943 and entered the service Jan. 1, 1944.

NAVY

SIX HOSPITAL SHIPS TO JOIN NAVY

The U. S. S. *Tranquility,* first of a new class of navy hospital ships being converted from Maritime Commission C-4 hulls, was recently inspected at the Atlantic Basin Iron Works in Brooklyn. The Navy is acquiring six of the 15,000 ton air conditioned ships with a speed of 17½ knots. The vessels will have hospital beds for 802 patients, including 742 enlisted men and 60 officers. Under emergency conditions, however, the craft may carry several hundred more cases. A ship's company will consist of 58 officers, 30 nurses, 2 women Red Cross workers, 24 petty officers, 230 crew members and 238 hospital ratings. The *Tranquility,* which will be commissioned soon, will be commanded by Capt. Merritt D. Mullen, U.S.N.R. The senior medical officer will be Capt. B. W. Hogan, U.S.N., with Lieut. Sylvia Koller, U.S.N., as chief nurse.

PLAQUE IN MEMORY OF LIEUTENANT F. B. BEGOR

McGill University has prepared a plaque in memory of the late Lieut. F. B. Begor U.S.N.R. Medical Corps, which is to be placed in the ward room of the U. S. destroyer bearing Dr. Begor's name. The plaque reads "In proud memory of Fay Broughton Begor, M.D., C.M., (McGill) Lieutenant (jg), Medical Corps, U.S.N.R., who was posthumously awarded the Navy Cross for his gallantry under fire on the beaches of Lae, New Guinea, in September 1943, and in tribute to the four hundred graduates of McGill University who are serving with the armed forces of the United States of America."

NAVY AWARDS AND COMMENDATIONS

Lieutenant (jg) Edgar M. Rector

The Silver Star Medal was recently awarded to Lieut. (jg) Edgar M. Rector, formerly of Ann Arbor, Mich., "for conspicuous gallantry and intrepidity in action against the enemy on the islands of Saipan and Tinian, Marianas group, while serving as a medical officer with an infantry battalion. On July 3, 1944, when the entire front line was forced to withdraw because of heavy enemy fire, Lieutenant (junior grade) Rector remained forward of our lines until late at night, administering first aid and plasma to the wounded until they could be evacuated. Later on Tinian, despite a painful wound in his hand, he moved forward under fire to aid a wounded Marine who could not be evacuated. Lieutenant (junior grade) Rector received a serious chest wound at this time. His outstanding courage and disregard for his own safety were in keeping with the highest traditions of the United States Naval Reserve." Dr. Rector has also been the recipient of the Silver Star, the Purple Heart and a Presidential Unit citation. He graduated from Harvard Medical School, Boston, in 1941 and entered the service Nov. 1, 1943.

Lieutenant Michael J. O'Grady

Lieut. Michael J. O'Grady, formerly of Nutley, N. J., was recently awarded the Bronze Star for bravery in the Southwest Pacific. The citation read, in part, "After receiving an emergency call from a patrol craft he entered a small open boat and with disregard for his own safety made his way to stricken craft through intense crossfire, rendering medical aid and saving many lives." Dr. O'Grady graduated from Georgetown University School of Medicine, Washington, in 1933 and entered the service in November 1942.

Lieutenant Jesse John Wimp

The Bronze Star was recently awarded to Lieut. Jesse John Wimp, formerly of Kirksville, Mo. The citation accompanying the award read "for meritorious service as medical officer attached to a Marine Battalion in the Empress Augusta Bay Area, Bougainville, Solomon Islands, from Nov. 7, 1943 to Jan. 20, 1944. With the assistance of one junior officer and a small enlisted staff, Lieutenant Wimp established four organizational sick bays and rendered medical assistance not only to his own battalion but to all other troops in the area. Although suffering from a painful illness during the entire period, he worked tirelessly, treating or supervising the treatment of more than 300 sick and wounded a day despite the ever present danger from constant attacks by enemy bombers and artillery. His courageous devotion to duty and inspiring leadership were in keeping with the highest traditions of the United States Naval Service." Dr. Wimp graduated from Washington University School of Medicine, St. Louis, in 1933 and entered the service Sept. 7, 1942.

Lieutenant Paul Ashley

Lieut. Paul Ashley, formerly of Chicago Heights, Ill., was recently awarded the Bronze Star "for distinguishing himself by heroic and meritorious achievement in connection with operations against the enemy as division medical officer aboard an aircraft carrier on Nov. 25, 1944 off the coast of the Philippines while this vessel was under attack by Japanese aircraft. During and after a heavy aerial assault by Japanese aircraft he displayed exceptional ability and untiring devotion to duty which contributed greatly to the recovery of many wounded. His relentless zeal in the execution of his duties was exemplary and at all times in keeping with the highest traditions of the United States Naval Service." Dr. Ashley graduated from Rush Medical College, Chicago, in 1937 and entered the service Nov. 30, 1942.

Lieutenant (jg) Francis Ambrose Lagorio Jr.

Lieut. (jg) Francis Ambrose Lagorio Jr., formerly of Chicago and now battalion surgeon of the 7th Marines, 1st Division, has been commended for heroism in the bitter fighting on Peleliu Island last September and October by the Marines' commanding officer, Lieut. Gen. H. M. Smith. The citation states that "Lieutenant Lagorio organized and directed stretcher bearers to the front and to the rear. . . . He . . . contributed greatly to the ultimate combat efficiency of the battalion." Dr. Lagorio graduated from Loyola University School of Medicine, Chicago, in 1943 and entered the service early in 1944.

Dr. Paul E. Walker

Dr. Paul E. Walker, formerly of Louisville, Ky., was recently awarded the Legion of Merit for "exceptionally meritorious conduct" as medical officer on the assault transport *Cavalier* in the Pacific. Dr. Walker graduated from the University of Tennessee College of Memphis in 1931 and joined the Public Health Service in 1934. He was stationed at the Marine Hospital in Louisville, Ky., prior to his overseas assignment. The citation stated in part that Dr. Walker "displayed exceptional ability in organizing and training the medical department of the assault transport during operations at Saipan and Tinian Islands and at Leyte."

Captain Charles P. Archambeault

The Bronze Star was awarded to Capt. Charles P. Archambeault, formerly of Washington, D. C., and now with the 3d Marine Division somewhere in the Pacific. He was cited for sending troops into battle in good physical condition and training medical personnel who held losses from sickness and wounds down to a minimum during the Guam campaign. Dr. Archambeault graduated from Albany (N. Y.) Medical College in 1918 and entered the service Nov. 12, 1920.

Commander Alpha Rees Klopfenstein

Comdr. A. Rees Klopfenstein, formerly of Toledo and now commanding officer of a Navy hospital which was in operation on Saipan two days after the initial landings, according to an overseas dispatch from the U. S. Marine Corps, was awarded the Bronze Star for his share in this achievement. Dr. Klopfenstein graduated from the University of Michigan Medical School, Ann Arbor, in 1925 and entered the service Jan. 2, 1942.

Commander Fred Shapiro

Comdr. Fred Shapiro, formerly of Chicago, was recently awarded the Legion of Merit at the U. S. Naval Hospital in Seattle, where he is now staff surgeon, for serving as marine regimental surgeon during the Tarawa, Gilbert Islands, Saipan and Tinian operations. The citation read, in part, "his skill as a surgeon contributed greatly to the saving of many lives.

During this period he personally took care of 262 compound fractures, displaying outstanding skill and untiring effort in the care of the wounded." Dr. Shapiro graduated from the University of Illinois College of Medicine, Chicago, in 1931 and entered the service March 30, 1942.

Commander Carnes Weeks

The Navy's Commendation Ribbon was recently presented to Comdr. Carnes Weeks, formerly of New York. The citation accompanying the ribbon read "For outstanding service in the line of his profession while serving as fleet and staff surgeon on the staff of commander Third Fleet during a series of highly successful offensive attacks on the western Carolines, the Bonins, Nansei Shoto Islands, Formosa, Luzon-Visayas-Mindanao areas in the Philippine Islands, French Indo-China bases and Hong Kong-Canton-Hainan areas in support of Central and Southwest Pacific Amphibious operations covering the period of Aug. 24, 1944 to Jan. 26, 1945. Commander Weeks assisted materially in planning for the evacuation of the wounded in connection with the amphibious operations conducted by the Western Pacific Task Forces (Third Fleet) against the Palaus and Ulithi Atoll. In addition thereto this officer, throughout the period of operations, was instrumental in the maintenance of the morale and well-being of the commander, members of his staff and the Flag complement during a most difficult and arduous cruise. His conduct throughout was in keeping with the highest traditions of the United States Naval Service." Dr. Weeks graduated from Columbia University College of Physicians and Surgeons, New York, in 1923 and entered the service Feb. 28, 1942.

MISCELLANEOUS

SURPLUS MEDICAL AND SURGICAL EQUIPMENT FOR CIVILIAN USE

Announcement was made through the April 28 issue of the *Surplus Reporter,* published monthly by the Department of Commerce, Office of Surplus Property, formerly Treasury-Procurement, of a large variety of surplus surgical equipment and supplies now available to tax supported institutions and established firms selling to the profession. Included in the list of items offered are 15 Graefe's largest size Strabismus hooks, 163 Tyrroll iris hooks, an assortment of nasal, ear, sphenoid, tonsil and other knives, and several lots of minor operating scalpels, some with two handles and twelve blades in a canvas case, some with 1 inch, 1½ or 2 inch sharp point blades. Also included are nasal, bandage, dissecting, surgical, ganglion and operating scissors, 22 intestinal clamps, 176 hemostatic and 11 tenaculum forceps and 19 used tonsil hemostats of the clamp type. The catalogue also lists 35 galvanized iron food trucks equipped with 20 cold trays and 110 alternating current three phase heater and compact server, suitable for use in institutions or hospitals. A list of the regional offices of surplus property was published in the March 17 issue of THE JOURNAL. At that time the program was under the Treasury Department. It has since been transferred to the Department of Commerce, Office of Surplus Property, the offices remaining the same.

HOSPITALS NEEDING INTERNS AND RESIDENTS

The following hospitals have indicated to the Council on Medical Education and Hospitals that they have not completed their house staff quota allotted by the Procurement and Assignment Service:

(Continuation of list in THE JOURNAL, May 5, page 37)

CALIFORNIA

Hospital of the Good Samaritan, Los Angeles. Capacity, 455; admissions, 10,695. Miss Margaret J. Wherry, R.N., Superintendent (Resident—pathology, July 1, disqualified for military service).

ILLINOIS

Norwegian-American Hospital, Chicago. Capacity, 232; admissions, 6,151. Mr. James E. Moore, Superintendent (intern, July 1).

LOUISIANA

Shreveport Charity Hospital, Shreveport. Capacity, 790; admissions, 12,172. Dr. Edgar Galloway, Superintendent (2 interns, July 1).

NEW JERSEY

Mercer Hospital, Trenton. Capacity, 274; admissions, 6,115. Mr. George H. Buck, Superintendent (interns).

NEW YORK

Coney Island Hospital, Brooklyn. Capacity, 300; admissions, 5,519. Dr. Saul M. Penner, Medical Superintendent (5 interns, July 1 and August 1).

NORTH CAROLINA

Watts Hospital, Durham. Capacity, 225; admissions, 7,527. Mr. Samuel B. Forbus, Superintendent (assistant resident—surgery, disqualified for military service).

PENNSYLVANIA

Women's Homeopathic Hospital, Philadelphia. Capacity, 400; admissions, 3,197. Miss Mary A. Smith, Administrator (intern, disqualified for military service).

WARTIME GRADUATE MEDICAL MEETINGS

The following subjects and speakers for Wartime Graduate Medical Meetings have just been announced:

California

Station Hospital, Fort Ord: Experiences with Infectious Diseases in Army Camps in England, Dr. Gordon E. Hein, May 19; Suppuration of the Chest, Dr. Clayton G. Lyon, May 19.

U. S. Naval Hospital, Mare Island: Abdominal Surgery, Dr. Thomas F. Mullen, May 18; Surgery of the Gallbladder, Dr. H. Glenn Bell, May 25.

Illinois

A. A. F. Regional Hospital, Scott Field: Psychosomatic Medicine, Dr. Robert E. Britt, May 17; X-Ray Findings in Chest Injuries, May 31.

Nebraska

Station Hospital, Army Air Base, Kearney: Hematuria, Dr. W. Joseph McMartin, May 21; Management of Common Anorectal Conditions, Dr. Louis E. Moon, May 21; Recent Advances in Diabetes Mellitus, Dr. John R. Kleyla, May 21.

South Dakota

Station Hospital, Army Air Base, Rapid City: Common Lesions of the Fundus Oculi, Dr. Charles M. Swab, May 17; Psychoneuroses and Psychosomatic Disorders, Dr. A. E. Bennett, May 17; Surgical Management of Carcinoma and Ulcer of the Stomach, Dr. J. Dewey Bisgard, May 17.

Station Hospital, Army Air Base, Sioux Falls: Thrombocytopenic Purpura, Dr. Joseph D. McCarthy, May 29; Radiation Treatment of Benign and Inflammatory Conditions, Dr. Roy W. Fouts, May 29; Granulopenia, Dr. Warren Thompson, May 29.

MEDICAL AND SURGICAL RELIEF COMMITTEE OF AMERICA

The Medical and Surgical Relief Committee of America, Inc., 420 Lexington Avenue, New York 17, recently donated 12 million units of penicillin to the French Hospital of Ste. Anne in Toulon, France, in answer to an appeal received from Vice Admiral Raymond Fenard, chief of the French Naval Mission in the United States, for help in treating the wounded. In October and December of 1944 the committee sent assorted medical and surgical supplies and 50,000 vitamins to Ste. Anne's, and in February of this year an ambulance. Mrs. Huttleston Rogers, executive chairman of the Medical and Surgical Relief Committee of America, reported that contributions for the month of April to Italy, India, China, Africa, France, Bolivia and the United States brought the total value of donated medicines and drugs to $714,290.71. Through its ability to assemble medical materials quickly and because of its stock of used instruments (often unobtainable new) the committee has been the means of bringing relief at crucial times to our own service, to allied fighting forces, to hospitals and to welfare agencies and to missions.

ORGANIZATION SECTION

Postwar Medical Service

THE JOINT COMMITTEE ON POSTWAR MEDICAL SERVICE

Meeting of March 17, 1945

The meeting of the Joint Committee on Postwar Medical Service was called to order by the Chairman, Dr. Ernest E. Irons, in the Board of Trustees Room of the American Medical Association Building, Chicago.

There were present, as members of the committee of the American Medical Association, Drs. E. L. Henderson, H. H. Shoulders, Olin West and Morris Fishbein; as members of the committee of the American College of Physicians, Drs. Ernest E. Irons and W. W. Herrick; as members of the committee of the American College of Surgeons, Drs. Frederick A. Coller, Evarts A. Graham, James M. Mason and Irvin Abell and, representing the organizations named, Federation of State Medical Boards, Dr. Walter L. Bierring; American Hospital Association, Mr. Graham L. Davis; Veterans Administration, Col. Hugo Mella; Liaison Office, Lieut. Col. Robert D. Bickel; Association of American Medical Colleges, Dr. Fred C. Zapffe; Catholic Hospital Association, Rev. A. M. Schwitalla, S.J.; Advisory Board for Medical Specialties, Dr. Paul C. Bucy; American Dental Association, Dr. Lon W. Morrey; U. S. Public Health Service, Col. F. V. Meriwether; Office of the Surgeon General, War Department, Col. F. M. Fitts, Lieut. Col. G. R. Gessner, Lieut. Col. H. C. Lueth and Col. G. M. Powell. Also present were Dr. Herman L. Kretschmer, President of the American Medical Association; Dr. R. L. Sensenich, member of the Board of Trustees of the American Medical Association, and Dr. Victor Johnson, Secretary of the Council on Medical Education and Hospitals.

Approval of Minutes of Meeting of Feb. 10, 1945.—The Chairman stated that changes in the circulated minutes suggested by Lieut. Col. Gessner, Father Schwitalla, Mr. Davis and Colonel Mella had been made and were incorporated in the minutes as published in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION for March 17. The minutes as circulated, with the changes mentioned by the Chairman, were approved.

Committee Membership.—It was announced by the Chairman that Mr. Barry C. Smith, general director of the Commonwealth Fund, New York, had been appointed to serve as a member of the Joint Committee representing the American Medical Association and had accepted the appointment; that Dr. W. W. Herrick of New York had accepted appointment to represent the American College of Physicians in place of Dr. W. W. Palmer, resigned, and that Dr. B. R. Kirklin of Rochester, Minn., would represent the Advisory Board for Medical Specialties.

The Chairman introduced Dr. Paul C. Bucy, representing the Advisory Board for Medical Specialties in the absence of Dr. Kirklin, and Dr. Lon W. Morrey, representing the American Dental Association in the absence of Dr. C. W. Camalier.

Further Progress Report on Questionnaires Sent to Medical Officers.—Lieutenant Colonel Lueth presented an informative report concerning industrial medical practice and the economic aspects of postwar practice, covering the second two parts of the complete analysis of the postwar planning questionnaires that had been returned by medical officers. (The report presented by Dr. Lueth at the meeting of the Joint Committee on Feb. 10, 1945, covered the first two parts of the complete analysis and appeared in THE JOURNAL for March 31, 1945.) Following is a summary of the present report:

INDUSTRIAL MEDICAL PRACTICE

In the pilot questionnaire sent to 3,000 medical officers by the Committee on Postwar Medical Service, a number of questions concerning industrial medical practice were included. In the response only a small number of men indicated interest in this field, and the section on industrial practice in the final questionnaire was limited.

One fourth, 4,215, of all medical officers who returned the questionnaire indicated that they were interested in the industrial field; 863 men wanted full time positions. Requests for full time positions were scattered among the different graduation groups. Of the medical officers who would like to have full time positions in industrial medicine 56 per cent, or 484, indicated a desire to have special training to qualify for such positions; 44 per cent, 379, did not wish special training. The greatest number of requests for special training came from the most recent graduates.

About four times as many men wanted part time positions in industrial medicine as wanted full time positions. A little more than one third of those who would like to engage in part time industrial practice would also like to take special training. Special courses in industrial medicine were requested by 1,809 medical officers, including men who desired full time and part time positions and men who were undecided about future positions in industrial medicine.

In addition to the answers obtained from the section of the questionnaire specifically devoted to industrial medical practice, replies to questions on educational training indicated that 34 men wanted training in industrial medicine, 21 wishing short courses and 13 longer courses. Nearly all of the 13 who wished longer courses graduated before 1934, and about half of them were in industrial practice before entering military service.

A total of 4,215 medical officers expressed a desire to engage in industrial medical practice. About 80 per cent, 16,579, definitely indicated that they were not interested in this branch of medicine. The study revealed that the major fields of interest were industrial surgery, insurance and plant medical department work. It appears that those interested in furthering sound industrial medical practice in the future should seek to interest and encourage the younger men.

ECONOMIC ASPECTS OF POSTWAR PRACTICE

Economic aspects of future medical practice were indicated by the desires expressed by medical officers in 21,029 returned questionnaires analyzed.

The questionnaires were first studied for indications of the type and location of former medical practice, and it was found that 27.4 per cent, 5,785 medical officers, were formerly in general practice and 34.5 per cent, 7,282, had been in special practice. More than one third of the group studied, 7,962, gave no indication of their former type of practice or had not been in civilian practice before entering the armed forces. The total number of those who came directly from internships or residencies was 6,831.

Of the men formerly in general practice, 624 were from communities of less than 2,500 population, 1,962 from towns of between 2,500 and 25,000, 1,509 from cities of from 25,000 to 250,000 and 1,592 from the large cities of over 250,000 population. Only 61 of the 7,282 medical officers who were formerly in special practice came from communities of less than 2,500, and 791 from communities of between 2,500 and 25,000. More than three fourths of the specialists came from large cities, 2,500 from cities of 25,000 to 250,000 and 3,246 from cities of more than 250,000. Many, both general practitioners and specialists, did not indicate the size of their former locations. Among the specialists, about 40 per cent had been certified by the American specialty boards. Four fifths of the certified specialists had been graduated prior to 1935.

An analysis of the desires of medical officers to engage in private practice showed an increased interest in special types of practice. Of the 5,785 men who came from general practice, 4,326 indicated a desire to return to it. There were 3,530 medical officers who wanted to engage solely in general practice. Only 158 desired to return to communities of less than 2,500 population, compared to 625 who came from places of that size. About half as many wanted to return to communities of 2,500 to 25,000 and of 25,000 to 250,000 as originally came from them. Relatively few, 315, wanted to engage in general medical practice in cities of more than 250,000, compared to 1,592 who were formerly located in such cities. More than half, 418, of the 796 medical officers who indicated a desire to engage in general medical practice combined with part time teaching would like to practice in communities of more than 25,000 population.

Nearly two thirds of all medical officers in the group studied, 12,627, were interested in future specialty practice. Of these, about one half desired to engage solely in special practice and the other half in special practice combined with part time teaching. The whole group represents about half again as many as originally were engaged in special fields. Those interested in future specialty practice seemed to favor communities of 25,000 to 250,000 population.

One of the queries included in the questionnaire was "What is the minimum salary you would accept on a salary basis?" Only about half, 9,683, of the group studied replied to this question. There was a wide range in the answers, but the median appeared to be about $500 a month.

Four questions asked of the medical officers concerned voluntary redistribution to areas needing physicians. About 13 per cent, 2,817, stated that they would be willing to go to such an area if an office was already established; 11 per cent, 2,364, would go if a subsidy was provided for several months; more than 15 per cent, 3,284, would be willing to move if diagnostic facilities were available, and nearly 29 per cent, 6,091, would go if there were hospital facilities. From a study of the graduation groups involved, it appears that the younger men are willing to move into communities needing physicians, under certain preferred conditions, and that the majority of the graduates of 1937 or earlier are not willing to accept relocation.

The question of full time government service as a future type of medical practice was included in the questionnaire. About 85 per cent

of the medical officers indicated that they did not desire to remain in government service. Only 2,501 medical officers stated that they would like to stay in government service. Officers of the regular medical departments of the Army and Navy and other government services were considered separately in the study. Of this group of 532, 49 were older men who presumably wished to be retired after the war.

After extended discussion, the progress report was received and publication authorized.

Further Progress Report on Educational Internship and Residency Opportunities for Medical Officers.—Dr. Victor Johnson informed the Committee that he and Lieutenant Colonel Bickel were working out a plan whereby there will be available through the Bureau of Information at American Medical Association Headquarters as complete information as possible concerning openings in hospitals for internship and residency training. Requests for such information are already being received from returned medical officers, and it is expected that the machinery for providing it will be running smoothly in a very short time.

Dr. Graham thought that the number estimated by Dr. Johnson, 12,500, as desiring residencies probably was greater than would actually be the case, and Dr. Johnson agreed that probably the 12,500 or more men who had said that they wanted six months or more of hospital training would not all carry through on their desires, but he thought that it was better to be prepared for too many rather than for too few.

There was a lengthy discussion by most of those present, and it seemed to be the consensus that the most pressing single problem is the supply of physicians three years from now.

Dr. Johnson stated that his report will be ready for publication shortly, and the Committee authorized such publication.

Bureau of Information.—Lieutenant Colonel Bickel gave a brief report on the work of the Bureau of Information, stating that excellent cooperation was being had from the state medical societies, a follow-up system is being established, 65 requests for specific information as to places where men can practice have already been received, and the material for supplying answers to such requests is being gathered from the Procurement and Assignment Service, the U. S. Public Health Service and other agencies. To give the Committee an idea of what the men want to know, Dr. Bickel read one or two letters received from medical officers.

The Chairman stated that the report showed definite progress and growth and that one of the most important features of this bureau should be complete cooperation with the state organizations.

Local Organization of Courses for Graduate Study.—Dr. Johnson stated that the Council on Medical Education and Hospitals collects information semiannually from all kinds of organizations regarding short courses and publishes it semiannually, and that from now on the Council will ask for information concerning possible expansion.

Report of Subcommittee to Draw Up Recommendations to the Governors of the States (Dr. Shoulders, Chairman; Dr. Paullin, Dr. Coller, Father Schwitalla and, as consultants, Lieutenant Colonel Lueth and Miss Switzer).—Dr. Shoulders, chairman of the subcommittee, stated that his committee had been very active and that specimen letters designed to be sent to the governors of the several states had been drafted.

Following intensive discussion of all phases of the proposals offered, it was moved that a letter harmonizing the various drafts read be sent in the name of the Joint Committee directly to the governors of the states and that copies of it be sent to all agencies in the states that should be concerned in the matter. An amendment was offered that the subcommittee be empowered to take the necessary steps for the development of committees within the states for the purpose of advising the governors, and the Committee took action as follows: That a letter along the lines outlined by Dr. Shoulders, with certain modifications, be sent to the governor of each state and, in addition, that the subcommittee be empowered to take additional measures to see that those in authority in the states are apprised that these letters have been sent and to suggest measures for the development of advisory committees.

The Committee then adopted a motion that the proposed letter be given adequate publication, including publication in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, as a part of the minutes of the Joint Committee after the letters had been sent to the governors.

The letter as finally prepared, approved by the subcommittee and sent to the governor of each state, territory and the District of Columbia is as follows:

April 17, 1945.

The Honorable————
Governor of————
————,
Dear Governor————

The undersigned Committee on Postwar Medical Service, composed of representatives from the several organizations mentioned, was created two years ago for the purpose of giving consideration to many medical problems which will arise as a result of the war and the demobilization which will follow.

Of particular interest to the Committee at the moment are the provisions of Public Law 346, 78th Congress (The G. I. Bill of Rights) as they may affect the entire field of medical education.

The governor of each state, as you doubtless are aware, is vested with the power and duty of certifying to the Veterans Administration the institutions in his state which are qualified to give acceptable courses of education and training in each of many categories.

The field of medical education, in its broadest sense, embraces (*a*) premedical education, (*b*) undergraduate education, (*c*) postgraduate education, (*d*) nursing education and (*e*) the education of medical technicians. There have been developed high standards of premedical education as well as undergraduate medical education. Medical schools are classified according to those standards. Similarly, there are well recognized standards in dental education and in nursing education. There should be little difficulty, therefore, in reaching decisions concerning institutions giving instruction in these fields.

This is true to a lesser extent with respect to the postgraduate education and training doctors receive in hospitals and with respect to schools for the education and training of medical technicians. It is true that many hospitals have been approved for intern and resident training and for the training of medical technicians in some fields. This approval is based on the number of beds and other facilities available in a hospital for teaching and the type of educational program carried on by the staff of the institution.

The importance of maintaining educational standards which are commensurate with the progress that has been made in the fields of medicine, dentistry and nursing must be obvious to you. The maintenance of these standards is in the public interest because they determine the quality of medical, dental and nursing care the public will receive.

It seems appropriate to suggest to you that certain schools which have thus far failed to secure approval will make effort to participate in the tuition payments under the G. I. Bill of Rights by having their names placed on the list of approved institutions which the governor will send to the Administrator of Veterans' Affairs. Such schools may be schools of the medical cults. These should be approved only after they thoroughly establish their ability to give a creditable course in the several subjects embraced in the basic sciences which are mentioned in the basic science laws in effect in most states.

The Committee on Postwar Medical Service is keenly aware of the difficulties which will face the governor in the administration of this act. We are aware also of the pressure which will be brought to bear on you to obtain your approval of institutions which are not qualified and equipped to give acceptable courses of education and training in these several fields.

The Committee, therefore, begs leave to recommend that the governor appoint an advisory committee composed of persons qualified to advise him with respect to the quality of education and training given by institutions in his state in the fields of medicine, dentistry, nursing and medical technology, which includes x-ray technicians as well as laboratory technicians.

The Committee wishes to assure the governor that the facilities and information in the hands of the Committee on Postwar Medial Service are available to him for whatever purpose he may wish to use them, and that we shall be glad to cooperate with him to whatever extent he may wish in the solution of these difficult problems.

Very respectfully yours,
COMMITTEE ON POSTWAR MEDICAL SERVICE
ERNEST E. IRONS, M.D., Chairman.
H. H. SHOULDERS, M.D., Secretary.

[List of Committee Members.]

Progress Report of Subcommittee on Surplus Medical and Hospital Supplies (Father Schwitalla, Chairman; Dr. Irons, Dr. Fishbein, Miss Switzer, Dr. Piersol).—Father Schwitalla presented a progress report, which he stated all the members of his subcommittee had seen but had not had opportunity to approve.

After discussion, the report of the subcommittee was received and filed, and consideration of the recommendations made therein tabled until the next meeting of the Joint Committee. The Chairman stated that the subcommittee would be continued to make a further report at the next meeting.

Further Progress Report on Laws Concerning Temporary Licensure.—Dr. Bierring informed the Committee that the Federation of State Medical Boards had held a meeting of

delegates on February 12 and 13, at which twenty-nine of the forty-four state boards were represented. Two definite actions were taken, one of which was to endorse the action of the Council on Medical Education and Hospitals recommending that the appointment of residents and house officers in approved hospitals be made only from graduates of approved medical schools. The second action had to do with temporary licensure: It was the opinion of the federation delegates that no definite action should be taken as regards any recommendation to state boards, that each individual board is responsible for determination or action. Dr. Bierring said it was the general feeling that temporary action was not the solution and that permanent licensure would be better. There is an altogether sympathetic attitude on the part of state board officers with respect to discharged medical officers. Some states have already acted, and others are sympathetic to permitting licensure for those graduates of approved schools returning from military service by exempting them from examination or giving credit for experience gained in military service. He thought that the individual state boards could be depended on to be very considerate in endeavoring to harmonize existing regulations for the benefit of those who desire to relocate.

Formulation of Lists of Medical Officers to Be Considered for Demobilization.—The Chairman brought up the matter of the formulation and submission of lists of medical officers needed in essential civilian positions who might be considered for demobilization.

Dr. Zapffe stated that the Association of American Medical Colleges has submitted a list of essential teachers to the Procurement and Assignment Service but that, so far as he knows, no action has been taken by the Army or Navy. Lieutenant Colonel Lueth thought the Joint Committee should figure out a "civilian adjusted service rating" card for the purposes involved. On motion of Dr. Henderson, duly seconded and carried, the Chairman appointed the following subcommittee to study the problem and bring recommendations to the Joint Committee: Dr. Frederick A. Coller, Chairman; Dr. Victor Johnson, Dr. H. H. Shoulders, Lieut. Col. H. C. Lueth, Dr. Fred C. Zapffe, Dr. Walter L. Bierring, Dr. W. W. Herrick and Rev. A. M. Schwitalla.

Report of Subcommittee on Establishment of Medical Corps in the Veterans Administration.—Father Schwitalla, chairman of the subcommittee, presented the following report, stating that the action called for is a decision by the Joint Committee as to whether or not the subcommittee should interest itself in supporting one or the other of the bills mentioned in the report, whichever is recognized as the more desirable:

This subcommittee was created by the Committee on Postwar Medical Service in response to the suggestion expressed by some Committee members that some of the criticisms leveled by professional persons and the public against the quality of medical care given to our veterans under the present form of organization of the medical service in the Veterans Administration are possibly justified. The subcommittee as such is not concerned with the validity of the criticism but is concerned with the important suggestion that there should be in the Veterans Administration for the effective medical care of the veterans, by reason of the enormous size of the problem as well as for many other reasons, a medical corps comparable in standards, quality and numerical strength of the personnel and procedures to the Medical Corps in the Army, the Navy and the Public Health Service.

Two bills dealing with a reorganization of the medical service in the Veterans Administration have been introduced into the House of Representatives since the opening of the 79th Congress, first session, and have now been referred to the Committee on World War Veterans Legislation: H. R. 1661, introduced Jan. 22, 1945 by Mrs. Edith Nourse Rogers, Republican of Massachusetts, and H. R. 2253, introduced Feb. 19, 1945 by Mr. J. Percy Priest, Democrat of Tennessee.

THE ROGERS BILL, H. R. 1661

The purpose of the Rogers bill is "to authorize the establishment of a permanent veterans' medical and hospital service in the Veterans Administration, and for other purposes." The bill establishes the Medical and Hospital Corps (section 2 correction to be introduced), which includes the following corps: (1) Medical, (2) Nurse, (3) Laboratory Technicians, (4) Pharmacists, (5) Dietitians, (6) Social Work. It has been recommended by interested groups that there be also (7) a Dental Corps, (8) a Therapists in Physical Medicine Corps and (9) a Librarians' Corps. The functions of these various corps are suggested by their names and are to be more fully defined by the administrator. Clarifications in the bill are to be introduced here since, among other defects in this section, there seems to be some confusion in the designation of the various corps.

The bill goes on to define the Medical Corps, stating the membership of the various corps, sections 4 to 11 inclusive. (In section 7 there is mention for the first time of a Corps of Physical Therapists and Occupational Therapists.) Corrections must be introduced into sections 4, 5, 6, 7 and 11 to harmonize them with prevailing practice as well as to bring unity into the organization.

The successive sections, beginning with section 12, deal respectively with the appointment of the Surgeon General of the Veterans Administration and of the various heads of the several corps (section 12), filling of vacancies (section 13), requirements for promotion (section 14), power vested in the Surgeon General to prescribe rules and regulations (section 15), establishment of the Reserve Corps and its regulations (section 16), powers of a discipline board (section 17), interchangeability of officer personnel with the Army or the Navy (section 18), establishment of a professional medical council (section 19), authorization of expenses (section 20), authority for leaves (section 21), employment of civilian professional personnel (section 22), insignia (section 23), definitions particularly of military benefits (section 24), subjection of the corps to articles of war and exemption from Selective Service (section 24, c, d), commissioned officers and men of the corps entitled to benefits under U. S. Employees' Compensation Act (section 25), pay and allowances (section 26) and "conflict of law" clause (section 27).

COMMENT ON THE ROGERS BILL

The bill as presented by Mrs. Rogers seems in many respects excellent and meets the purposes which those have in mind who have pleaded for the establishment of a Medical Corps in the Veterans Administration. Some persons will, no doubt, say that the bill establishes too complex an organization, but when it is borne in mind that the organization is designed to take care of by far the largest group of persons for whom the government is directly responsible, it would seem that the type of organization contemplated in H. R. 1661 is by no means too intricate. The interim report of the Subcommittee on Wartime Health and Education, February 1945, shows abundantly how large is the responsibility of the government for the health needs of the veterans.

Some of the corrections in the bill besides those to which attention has already been called might be stated to be the following: The power of the Surgeon General to employ civilian technical personnel should be wider than it is now contemplated in the bill (section 22); equivalence for credit for time service in the various government agencies should be liberalized (section 26 a, 1); disability provisions should probably be extended (section 26 a, 2); certain Civil Service deductions had probably better be omitted (section 26 a, 3); other provisions of the bill with reference to pay, for example, exemption of retirement pay from taxation, will probably merit careful restudy (section 26 in toto) and possibly radical reformulation or deletion. Perhaps these "benefits" are not the concern of this subcommittee.

THE PRIEST BILL, H. R. 2253

The purpose of the Priest bill is stated to be "to establish in the Veterans Administration a commissioned service consisting of physicians, surgeons, dietitians, nurses and medical technicians."

Section 1 establishes the Veterans Administration Medical Service in the Veterans Administration to perform the functions and duties now being performed by civilian physicians, surgeons, dentists, dietitians, nurses and medical technicians. Section 2 defines the commissioned personnel, section 3 the medical director and deputy medical director, section 4 the grades, ranks and titles. Section 5 prescribes the method of appointment of commissioned personnel in both the regular and the reserve corps. Section 6 provides for pay and allowances for the different classes of officers and enlisted personnel, while section 7 provides for promotions and the separation of commissioned officers from the regular corps. Provision is made in section 8 for the retirement of commissioned officers, and in section 9 military benefits are defined. Section 10 authorizes an allowance for uniform and equipment for each commissioned officer. Interchangeability of personnel with the Army, Navy or Coast Guard is legalized in section 11. The power to write regulations is vested in the medical director, subject to the approval of higher authorities, section 12. Section 13 provides for the use of the service in war emergency, and finally section 14 authorizes appropriations made to the Veterans Administration under "salaries and expenses" to be available to the personnel authorized by this act.

RECOMMENDATIONS

In view of the fact that at present these two bills are before committees of the House of Representatives, the subcommittee recommends to the Committee on Postwar Medical Service:

1. That the subcommittee be asked to submit the bills to further study with the intention of ascertaining the suitability of the bills for meeting (*a*) the needs of the veterans for a comprehensive medical and hospital service of a high order of excellence; (*b*) the needs of the Veterans Administration for a flexible, effective and professionally superior organization in the health care of the veterans; (*c*) the needs of the various professional groups in medicine and its related professions for an efficient organizational instrument within the Veterans Administration for channeling to the veterans the very best care which the various professions have to offer.

2. That the subcommittee give discriminating study to the two bills with the purpose of determining which of the two can better meet the purposes which the Committee on Postwar Medical Service has in mind.

3. That the subcommittee be requested to ascertain the responsible agencies which will carry through the bills pertaining to the health care of veterans from their present legislative status to final passage; to ascertain, furthermore, how the Committee on Postwar Medical Service can be of assistance in facilitating the passage of the bill and to determine in whose hands the leadership for sponsoring these bills should be centralized so as to avoid conflicting activities.

4. That the subcommittee determine to what extent the summary of recommendations of Report No. 4 of the Subcommittee on Wartime Health and Education is achievable more effectively through the development of a medical corps and auxiliary corps as contemplated in these bills.

5. That the subcommittee be authorized to enlarge its membership if such enlargement may seem desirable, depending on the interest which the Committee decides to take in furthering the passage of the bill.

ALPHONSE M. SCHWITALLA, S.J., Chairman.
LEROY H. SLOAN.
H. H. SHOULDERS.

After lengthy discussion, the Committee endorsed the intent and provisions of the Rogers Bill, H. R. 1661, with modifications that are quite generally recognized as necessary and that have already been submitted, and the subcommittee was continued and instructed to report further at the next meeting.

Report of Subcommittee on Enrolment of Medical Students.—The report of the Subcommittee on Enrolment of Medical Students was presented by Lieutenant Colonel Lueth. (This report was printed in THE JOURNAL, April 7, p. 931.)

Dr. Johnson presented each member of the Committee with a statement which he and Dr. Zapffe had prepared in anticipation of hearings to be held on the Ellender bill, S. 637. Dr. Zapffe commented on some portions of the statement presented by Dr. Johnson, saying that the emergency is acute; the medical schools are concerned about the output of physicians; as the outlook is now, there will be very few graduates in 1949 and in 1950 there probably will be none; out of every entering class 20 to 25 per cent do not graduate; if no students are available for 1946, it is essential that something be done; in the main, the Ellender bill should be supported in principle and everything possible done to secure its passage.

Colonel Fitts presented figures showing the estimated number of graduates in medicine for the years 1945 through 1949 under Army and Navy specialized training programs. He stated that while the Navy is putting some men into first year classes in 1946 the Army is not, which means that the graduates in medicine in 1950 will be limited to women, 4-F's and veterans.

It was stated by Dr. Zapffe that the Association of American Medical Colleges had gone into this matter with the Veterans Administration. The Committee concluded that there would be hardly any of the now returning men available to the medical colleges, so that only two groups could be counted on—the women and the 4-F's.

The report of the subcommittee presented by Lieutenant Colonel Lueth, recommending support of the Ellender bill, was approved.

Additional Member of Subcommittee on Enrolment of Medical Students.—Pursuant to remarks by Lieutenant Colonel Lueth, the Chairman appointed Dr. Fred C. Zapffe as a member of the Subcommittee on Enrolment of Medical Students.

Letters from Medical Officers.—The Chairman presented for the interest of the Committee a letter from an overseas medical officer, and Colonel Powell informed the Committee that it has been learned informally that the European theater plans to carry out a program of professional rehabilitation for medical officers as far as time and other conditions permit.

Informational Reports.—Office of the Surgeon General, War Department: Lieut. Col. G. R. Gessner stated that the Army Air Forces has instituted a clinical refresher training program for its medical officers similar to the Army program; it provides two weeks of didactic work and ten weeks of hospital work. (An account of this activity appeared in THE JOURNAL for April 7, 1945.)

American Dental Association: Dr. Morrey presented a report of the War Service and Postwar Planning Committee of the American Dental Association in accordance with the request of Dr. C. W. Camalier. (This report was also presented to the Committee on Feb. 10, 1945.)

Liaison Office: Lieutenant Colonel Bickel reported that the project of replying to medical officers who submitted questions on their returned Postwar Planning Questionnaires has been completed for the first 23,000 questionnaires, and each officer submitting such questions has been sent a personal reply in the name of the Committee on Postwar Medical Service. Questions dealing with policies of this committee were referred to Dr. Irons for reply; questions concerning policies of the American Medical Association were referred to Dr. West; questions about medical education were referred to Dr. Johnson and Dr. Arestad, and questions concerning licensure, reciprocity and other legal matters were referred to Mr. J. W. Holloway Jr. for information on which to base replies. All other inquiries were answered directly. There were about 200 such replies sent out, and the work of answering the questions of medical officers is now current. As new inquiries come in they will be answered immediately.

Time and Place of Next Meeting.—The Committee voted to hold its next meeting at the American Medical Association Headquarters in Chicago on Saturday, May 12, 1945.

The meeting adjourned at 1:50 p. m.

H. H. SHOULDERS, M.D., Secretary.

Bureau of Information

KANSAS REPORTS

Mr. Oliver E. Ebel, executive secretary of the Kansas State Medical Society, has recently sent the Bureau of Information valuable data concerning some of the counties in Kansas. These reports contain unusually concise and descriptive remarks about the general characteristics of the counties and of the present needs of these areas for physicians.

The accompanying table gives certain of the economic data for ten representative counties chosen from various sections of the state.

Kansas

County [1]	Principal Cities [2]	Population	Physicians Under 65	Persons per Physician	Persons per Telephone [3]
Doniphan	.....	10,408	4	2,602	6
Ellis	Hays	16,034 6,385	12	1,336	10
Graham	.....	4,404	0	.....	12
Johnson	Olathe	40,229 3,979	4	10,057	7
McPherson	McPherson	22,904 7,194	6	3,817	5
Ness	.....	6,395	1	6,395	7
Saline	Salina	32,974 21,073	17	1,940	6
Sedgwick	Wichita	194,945 114,966	113	1,725	7
Shawnee	Topeka	84,765 67,833	40	2,119	5
Wyandotte	Kansas City	144,453 121,458	63	2,293	9

1. Bureau of census, estimated population 1943.
2. Bureau of census, population 1940.
3. Based on 1940 figures, American Telephone and Telegraph Company.

Excerpts from the remarks contained on the county summary sheets follow:

Doniphan.—Doniphan County is in the northeast corner of the state. It is an apple growing area without large cities and with almost no other industry. The county is separated from St. Joseph, Mo., by the Missouri River and is near Kansas City.

Ellis.—Ellis County is located in the center of the western third of the state and has splendid medical facilities. These furnish medical and hospital care for a large portion of the western part of the state. Hays, on the eastern boundary of this area, is considered the most lacking in medical care. The comparatively high ratio of physicians here must be considered in respect to the wide area outside the county served by doctors.

Graham.—Graham County, north and west of Ellis County, represents a typical county in the western part of the state.

Johnson.—The close proximity of this county to Kansas City decreases the need for doctors in spite of a high physician-population ratio.

McPherson.—This county is an agricultural and oil producing district near the center of the state and includes a number of small towns. At the present time medical care is given by physicians who would be retired had the war not happened.

Ness.—This is an agricultural community. At the present time there is only one doctor.

Saline.—This county, like Ellis County, is considered a medical center. It serves an area east of Ellis County.

Sedgwick.—This, the second largest county in Kansas, has experienced a large wartime increase in population owing to the presence of several airplane factories and other war industries. This county is a business and medical center for the south central part of this state. It is locally estimated that the population is now 50,000 more than shown by the 1943 census figures.

Shawnee.—This county is the third most populous county in Kansas. It contains the state capital and many state operated institutions and medical facilities. Since many physicians in this county have full time appointments in various institutions or in the state board of health, the ratio of practicing physicians to population is higher than the table indicates.

Wyandotte.—This county is similar to Sedgwick County in many respects. Kansas City, Mo., is just across the river from Kansas City, Kan., and this factor influences the medical economic aspects of the area.

With the information available on a completely filled out summary sheet, it is readily possible for an interested medical officer to make an initial selection of areas in which he might like to practice. The further investigation through state and county medical societies is thus greatly facilitated, and much unnecessary correspondence and perhaps travel may be avoided. In many communities vacancies are being held open for physicians now in the medical service. The number of physicians listed may therefore be misleading and consequently direct correspondence with the county medical society will always be necessary.

Washington Letter

(From a Special Correspondent)

May 7, 1945.

V Day Not to End War for Army Doctors

Final victory on both fronts will not mean the end of the war for the physicians and surgeons of the Army Medical Department, Major Gen. George F. Lull, Deputy Surgeon General, told the Columbia University College of Physicians and Surgeons. With battle casualties returning at 30,000 to 40,000 a month, the department will be busy providing these men with medical and surgical care. General Lull says that many medical officers will be needed long after fighting stops. Long term cases will require considerable reconstructive surgery and will not reach the stage of maximum improvement until long after V day. The number of casualties is large in comparison with the number of skilled medical specialists, and it has been expedient to concentrate certain specialties in a relatively small number of hospitals, he explained. Special treatment centers have been established in a number of general hospitals in this country, covering one or more of the following specialties: amputation, neurosurgery, thoracic surgery, tropical diseases, surgery of blood vessels, neuropsychiatry, plastic surgery, care of the deaf and care of the blind.

Nurses Not to Be Drafted in This War

Major Gen. Norman T. Kirk, Surgeon General, states that although he still believes passage of the nurse draft bill is "absolutely necessary," it is unlikely that any American nurse will be drafted in this war. The measure requested by President Roosevelt January 6 passed the House March 7 and was approved by the Senate Military Affairs Committee March 28 but is being allowed to die on the Senate calendar. Representative Frances P. Bolton, Republican of Ohio, has told the senators that a nurse draft "would be unwise." Senator Edwin C. Johnson, Democrat of Colorado, and Senator Robert A. Taft, Republican of Ohio, promised to oppose the measure on the Hill if introduced and acting majority leader Lister Hill, Democrat of Alabama, has decided against calling it up.

National Induction of Cadet Nurses May 12

National induction ceremonies of the U. S. Cadet Nurse corps will be held Saturday, May 12, in cities and communities throughout the country, reports Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service. Extensive ceremonies will take place simultaneously with a coast to coast program from New York City. Dr. Parran will administer the formal induction pledge to nurses gathered at public ceremonies all over the nation. More than 60,000 new students enrolled since last year will take the formal pledge for the first time. Miss Lucile Petry, corps director, will pay special tribute to the cadet nurses.

Final Senate Approval for Hospital Bill Forecast

Despite a hitch in authorization of the Tydings-Bilbo bill for a 1,500 bed hospital center in Washington after the war, its sponsors expect final Senate approval. Senator Ellender, Democrat of Louisiana, has asked for reconsideration of passage of the bill voted last week by the Senate.

Capital Notes

The District of Columbia Social Hygiene Society has passed resolutions describing current District health regulations as too indefinite and ineffective for vigorous enforcement of venereal disease control measures and opposing H. R. 2424, a bill to create a quasiautonymous tuberculosis organization to supplant the present Tuberculosis Bureau of the District Health Department.

Chairman Basil O'Connor of the American Red Cross Society has thanked the nation for its oversubscription of the 1945 Red Cross War fund goal of $200,000,000. He reported that a total of $219,075,000 was contributed. He also announced that scores of trained disaster workers, including doctors and nurses, had been sent into tornado and flood areas of eastern Oklahoma, Kansas and Arkansas.

A rabies control bill for the District of Columbia is reported held up in the Budget Bureau awaiting the approval of Surg. Gen. Thomas Parran of the U. S. Public Health Service.

Corporation Counsel Richmond B. Keech opines that unless Congress enacts a law specifically authorizing the sterilization of feebleminded women no further operations of this kind can be performed in the District of Columbia.

To assure an adequate supply of amyl acetate, made from amyl alcohol, for the production of penicillin, the WPB announces that amyl alcohol and amyl acetate have been placed under allocation control.

Official Notes

DOCTORS LOOK AHEAD ON NATIONAL HOSPITAL DAY

Once in a long time a combination of occasions offers opportunity for a special broadcast in such a series as Doctors Look Ahead. On May 12 there occurs National Hospital Day and the fiftieth anniversary of the Chicago Lying-In Hospital. On this occasion the entire production facilities of the National Broadcasting Company needed for Doctors Look Ahead will be moved to the Dora De Lee Amphitheater at the Chicago Lying-In Hospital, and the program will be devoted to a history of the hospital and of the late Dr. Joseph B. De Lee—two stories which are inseparable and which typify the pioneer spirit behind the growth of American medicine. In broadcasting on this occasion the medical profession salutes not only this hospital and this doctor but all institutions and all doctors of similar type which exemplify American medicine at its best—free, daring, yet solidly scientific and constructively conservative.

In addition to the May 12 broadcast, The Beloved Pioneer, the following programs are scheduled:

May 19. Look Sharp.
May 26. Unfinished Business (Dr. Fishbein).

Doctors Look Ahead is heard on one hundred and twenty-three stations of the National Broadcasting Company network each Saturday at 4 p. m. Eastern War Time (3 p. m. Central War Time, 2 p. m. Mountain War Time and 1 p. m. Pacific War Time).

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ARIZONA

The Medical Quarter Hour.—The Arizona State Medical Association on March 26 opened a second series of radio transcriptions during its "Medical Quarter Hour" Monday night at 6:15 over station KTAR. "More Life for You!" is the theme of this series of transcribed interviews and round table discussions. The first series was devoted to "American Medicine Serves the World at War" and consisted of a small group of radio transcriptions. "Keep Cool" will be the theme of a series of transcribed interviews with Dr. William W. Bauer, Director of the Bureau of Health Education, American Medical Association, June 25 through September 10. This activity on the part of the state association includes the advertisement of the program in various papers of the state and the distribution of pamphlets to patients of physicians. The council of the association has appropriated funds to continue these broadcasts for a year.

ARKANSAS

Personal.—Dr. S. J. McGraw has been appointed health officer of El Dorado.——Dr. Albert S. Buchanan, Prescott, has been appointed a member of the state board of health.——Dr. and Mrs. William C. Russwurm, Helena, celebrated their golden wedding anniversary on January 10.

Oldest County Society in State.—The Phillips County Medical Society, which is considered the oldest medical society in Arkansas, held its seventy-fourth annual meeting recently. Dr. Earl F. Norton, Marvell, was chosen president and Dr. James W. Nicholls, Helena, vice president. Dr. Montague Fink, Helena, is permanent secretary of the society. The society was organized in 1871 and antedates the establishment of the Arkansas Medical Society.

CALIFORNIA

University News.—Dr. Isabella H. Perry, assistant professor of pathology, University of California Medical School, San Francisco, was recently given the additional title of coordinator for cancer clinics.

Personal.—Dr. Jacob C. Geiger, director of public health of the city and county of San Francisco, recently received the European and Catholic Order, the Cavaleiro da Ordem de Cristo (Order of Christ), in recognition of his services to the Portuguese people of Portugal and California.

Changes in Health Officers.—Dr. Nicolai N. Rilcoff, formerly venereal disease control officer with the Kern County Health Department, has been appointed health officer of the county, succeeding Dr. John K. Coker Jr., Bakersfield, effective April 1.——Dr. John A. Carswell, Santa Barbara, has resigned as health officer of Santa Barbara County.

Conference on Health Professions.—On April 21 the Conference on Health Professions was held on the San Francisco campus of the University of California for high school and junior college counselors. Sponsored by the Northern California Vocational Guidance Association and the University of California, the conference featured talks on the professions of medicine and allied occupations, dentistry and related fields, pharmacy, nursing and public health nursing and public health occupations.

ILLINOIS

Personal.—George H. Van Dusen became superintendent of the Christian Welfare Hospital, East St. Louis, April 5.——Dr. Paul H. Pernworth, Venice, addressed the student branch of the American Pharmaceutical Association at the St. Louis College of Pharmacy, St. Louis, March 22, on "Practical Application of Certain Pharmaceutical Agents to Clinical Medicine and Surgery."——Dr. John H. Brantley, Poplar Grove, recently completed fifty years in the practice of medicine.

Outbreak of Food Poisoning.—About 100 persons were known to be ill in St. Francisville, March 26, in an outbreak of food poisoning that was subsequently attributed to long horn cheese which had been purchased from two local stores. In the subsequent investigation the cheese from the two stores was found to have been obtained from the same distributor in a nearby town in Indiana and the sale was stopped. Additional investigation traced the cheese to East St. Louis and then to a cheese manufacturing plant in northern Illinois. During the investigation it was revealed that similar outbreaks showing symptoms of diarrhea, nausea, vomiting and fever occurred in other sections of the country including one in Dyersburg, Tenn. All of the cheese that could be located was withdrawn from the market by the distributor.

Chicago

Personal.—Dr. Josiah J. Moore, Treasurer of the American Medical Association and president of the Chicago Medical Society, will receive the honorary degree of doctor of laws by Montana State University, Missoula, during its graduation exercises in June. The degree is being awarded to Dr. Moore, an alumnus of the university, for his "distinguished record in pathology." Dr. Moore will deliver the commencement address.

Rorschach Test Course.—Samuel J. Beck, Ph.D., head of the psychology laboratory, Michael Reese Hospital, will conduct the Rorschach test course at the hospital, June 4-8. The records to be demonstrated will be representative of the older adolescent and younger adult with special emphasis on persons discharged from military services. Persons interested may communicate with the secretary of the department of neuropsychiatry at the hospital.

Meeting of Council of Social Agencies.—The twelfth annual meeting of the health division of the Council of Social Agencies of Chicago will be held in the ballroom of the Standard Club, May 16. Among the speakers will be Drs. Robert S. Berghoff on "Tuberculosis Control in the State of Illinois including County of Cook," and Reginald M. Atwater, New York, "Realistic Planning for Community Health." Mr. Alexander Ropchan is executive secretary of the health division of the council.

MARYLAND

Society News.—Dr. Samuel A. Cosgrove, Jersey City, N. J., addressed the semiannual meeting of the Baltimore City Medical Society April 6 on "Conservatism in Operative Intervention in Obstetrics."

Personal.—Dr. Lawrence F. Woolley, formerly clinical director of the Sheppard and Enoch Pratt Hospital, Towson, has been appointed director of therapy and research at the Haarlem Lodge, Cantonsville, and Elkridge Farm, Ellicott City.

Bureau of Medical Services.—The state board of health has been authorized to create a bureau of medical services under the provisions of a law which is to become effective June 1. The bureau will administer a program furnishing medical care for indigent and medically indigent persons and will conduct and operate the chronic disease hospitals to be constructed in the postwar period. A chief of the bureau will be nominated under the merit system by the director of health. A council of medical care will be established by the state board to assist in formulating policies connected with the medical care program.

MICHIGAN

Changes in Health Officers.—Dr. Ralph Ten Have, Grand Haven, health officer of Ottawa County, has resigned to enter private practice.——Dr. D. H. Swengel recently resigned as health officer of the Cass County Health Unit to accept a similar position with the Mecosta-Osceola District health unit.

The Hickey Memorial Lecture.—Dr. John B. Barnwell, associate professor of internal medicine, University of Michigan Medical School, Ann Arbor, gave the ninth annual Hickey Memorial Lecture before the Wayne County Medical Society, Detroit, April 2. His subject was "Observation of the Minimal Lesion." The Hickey lectures commemorate the life and works of Dr. Preston M. Hickey, who was the first chief of the roentgen ray department at Harper Hospital and later professor of roentgenology at the University of Michigan Medical School, a position he held until his death, Oct. 30, 1930.

Mental Clinics for Veterans.—Five clinics for veterans have been established by the Michigan Society of Neurology and Psychiatry at Ann Arbor, Detroit, Flint, Kalamazoo and Saginaw in cooperation with the Michigan State Hospital Commission and the state office of veterans' affairs. The Detroit clinic began accepting patients for treatment February 6. This clinic, which is financed principally by the war chest of metropolitan Detroit, occupies quarters provided by Harper Hospital and is in operation three evenings each

week; eighteen psychiatrists are contributing their services without compensation. Five additional clinics in upper Michigan are being planned by the Michigan Society of Neurology and Psychiatry sometime within the near future.

Regional Meeting of Federation for Clinical Research.—The first regional meeting of the American Federation for Clinical Research was held at the Dr. William J. Seymour Hospital, Eloise, March 10, with Dr. Gordon B. Myers, professor of medicine, Wayne University College of Medicine, Detroit, acting as chairman. Among the speakers were:

Dr. Paul H. Noth, Detroit, Follow-Up Studies on Patients with Heart Wounds.
Dr. Jere M. Bauer, Ann Arbor, Vitamin D Intoxication with Metastatic Calcification, a Fatal Dose in an Adult.
Drs. Charley J. Smyth and Andrew G. Lasichak, Eloise, Influence of Amino Acids on Voluntary Food Intake.
Drs. Edwin T. Williams and Franklin H. Top, Detroit, Graphic Method for Rapid Estimation of Clinical Status in Poliomyelitis.
Dr. John H. Seabury, Ann Arbor, Recent Treatment of Subacute Bacterial Endocarditis.
Dr. Herman M. Pollard, Ann Arbor, Effects of Lipotrophic Substances in Biliary Disease.

Centennial Celebration of St. Mary's Hospital.—A two day program, May 16-17, will be held at St. Mary's Hospital, Detroit, to observe its 100th anniversary. Dr. Euclide V. Joinville, president of the hospital staff, will give the address of welcome at the clinical program the second day, to be held for physicians in the auditorium of Wayne University College of Medicine. Among the speakers will be:

Dr. William J. Stapleton Jr., Detroit, History of Wayne University College of Medicine—St. Mary's Hospital Association.
Dr. Russell L. F. Cecil, New York, Modern Conception of Arthritis and Its Management.
Dr. Emil Novak, Baltimore, Functional Tumors of the Ovary.
Dr. Alexander Brunschwig, Chicago, Extension of Radical Surgery in the Treatment of Advanced Abdominal Carcinoma.

Dr. Frederick A. Coller, Ann Arbor, will preside at a round table discussion on diseases of the gallbladder, participated in by Drs. Hugo A. Freund and Charles S. Kennedy, Detroit, in addition to the other guest speakers. Dr. Arturo Castiglioni, professor of the history of medicine, Yale University School of Medicine, New Haven, will be the guest speaker at the dinner meeting in the Statler Hotel in the evening.

Annual Alumni Clinic Day.—Wayne University College of Medicine Alumni Association will hold its annual alumni clinic day in the auditorium of the medical school in Detroit, May 16. Among the speakers will be:

Dr. Loren W. Shaffer, Detroit, Modern Treatment of Syphilis.
Arthur H. Smith, Ph.D., Detroit, Recent Advances in the Field of Nutrition.
Dr. Paul H. Noth, Detroit, Rheumatic Fever.
Dr. Amedo S. Marrazzi, Detroit, Intravenous Anesthesia.
Dr. Charles B. Huggins, Chicago, Endocrine Treatment of Carcinoma of the Prostate.
Dr. Geza de Takats, Chicago, Problem of Thromboembolism.
Dr. J. Grafton Love, Rochester, Minn., Protruded Intervertebral Disks.
Dr. Roscoe R. Graham, Toronto, Ont., Surgery of Peptic Ulcer.

A dinner session, with Dr. Clarence E. Umphrey, Detroit, acting as toastmaster, will be addressed by Dr. Irvin W. Sander, Detroit, who will be installed as president at the meeting, and Dr. Clarence A. Mills, professor of experimental medicine, University of Cincinnati College of Medicine, Cincinnati, on "Climatic Imprint on Man." A feature of the meeting will be the inauguration this year of honors to fifty year graduates. Because of the initiation this year the classes from 1881 to 1885 will be similarly honored.

NEW HAMPSHIRE

George Moulton Honored.—Plans are under way to hold a testimonial dinner at the Statler Hotel, Boston, May 17, to honor George A. Moulton, Phm.D., Peterborough, in recognition of his service to pharmacy. Any one wishing to participate in the memorial should communicate with Carleton A. Wheeler, Gray Rocks, Old Street Road, Peterborough.

NEW JERSEY

New Head of Tuberculosis Division.—Dr. Irving Willner, assistant physician in charge of the division of tuberculosis of the bureau of health, Newark Health Department, has been appointed director of the division, succeeding the late Dr. M. James Fine.

Postwar Expansion for Medical Center.—Plans to expand the facilities of the Jersey City Medical Center after the war to care for children in a "hospital school" while their mothers are undergoing treatment were announced by Mayor Frank Hague, April 24. No specific plans were given, but it was indicated that the proposed school would be staffed with "nurses, teachers and physicians who would supervise and teach the children with expert care while they are temporarily orphaned."

Ricketts Prize Awarded.—Maurice R. Hilleman, Ph.D., Brunswick Arms, New Brunswick, has been awarded the Howard Taylor Ricketts Prize by the University of Chicago. The presentation of the award took place on the thirty-fifth anniversary of the death of Dr. Howard Taylor Ricketts, who died of typhus May 3, 1910, while conducting research on the disease in Mexico. Dr. Hilleman was given the prize for developing a way of making antiserum of value in identifying a recently discovered group of viral agents. The viruses which he studied cause disease in both animals and man and include the agents of psittacosis, lymphogranuloma venereum and atypical types of pneumonia. His investigations resulted in the discovery of a more efficient tool for identifying the viruses of this group. Dr. Hilleman is now engaged in investigative work in the field of trable viruses with E. R. Squibb and Sons.

NEW YORK

Changes in State Society Officers.—At the April meeting of the council of the Medical Society of the State of New York, Dr. Herbert H. Banus, Buffalo, resigned to make it possible for the president-elect, Dr. Edward R. Cunniffe, New York, to take over the office at the same time he normally would have if the house of delegates had met in May. Dr. Cunniffe assumed the presidency May 1. Dr. Walter Guernsey Frey Jr., New York, has been elected to succeed Dr. George W. Kosmak, New York, who has been acting as assistant secretary during the past few months of emergency in the society and who also resigned at the April meeting.

Results of Service Questionnaires.—Of the physicians who on April 24 had returned questionnaires to the war participation committee of the Medical Society of the State of New York, 518 indicated that they want to practice in the same location from which they came when they leave military service. About half of the group replied that they wanted postgraduate refresher courses when they return. Of the total, 193 think they will want or need financial assistance to resume practice on their return. Forty-five of the approximately 710 questionnaires returned thus far replied that they planned to stay in government service of some kind. The questionnaire study is a part of the society's program to assist members returning as medical veterans.

Kaiser Medal Goes to Colonel Wentworth.—The Rochester Academy of Medicine has announced Col. Edward T. Wentworth, M. C., as the Albert David Kaiser medalist for 1945. The medal is awarded annually by the academy to honor one of its own members whose services have been considered outstanding. Colonel Wentworth was chosen in recognition of both his community service and the honors he has won in military duty. Colonel Wentworth, who graduated at Harvard Medical School, Boston, in 1913, served an internship and residency at the Rochester General Hospital. He has spent all of his time practicing in Rochester with the exception of service in the two world wars. He was credited with organizing base hospital 19 in World War I and also in World War II, a unit which he now heads somewhere in Europe. After the first world war he was a member of the medical reserve corps. Colonel Wentworth is past president of the Medical Society of the County of Monroe, the Rochester Academy of Medicine and the Rochester Pathological Society. The medal was presented to Colonel Wentworth in absentia and the citation was read by Dr. Walter S. Thomas, Rochester. Dr. Harold W. Brown, professor of tropical diseases, DeLamar Institute of Public Health, Columbia University College of Physicians and Surgeons, New York, gave an address on "Tropical Diseases, with Special Reference to Filariasis."

Millions Authorized for Veterans' Aid.—Governor Dewey on April 17 signed a bill appropriating $2,825,000 for the first year's operation of a statewide program to aid returning war veterans in rehabilitation and employment. The program, which includes the creation of a veterans' affairs division in the state executive department, will proceed after the governor names a state director, who must be a veteran. The new division will be empowered to establish rest camps and local veterans' service agencies as well as coordinate other veterans aid plans and expand "on-the-job" and apprentice training programs. The service agency will be set up in each county with state aid up to $5,000. Newspapers indicated that the agencies also may be organized in cities. On April 22 the governor signed a bill extending to all handicapped persons, irrespective of the type or nature of the cause of their handicap, the benefits of machinery already set up by the state for the treatment of the physically handicapped. In a comment to the press, the governor said that "what makes this

legislation particularly important is the effect it will have in providing additional procedure for the care and adjustment of the many veterans who will be returning after this war is over and who will be in need of such care and adjustment." The bill was developed by the temporary veterans commission and the state department of mental hygiene and specifically removes the exclusion of epileptics from the benefits of the statute.

New York City

The Bela Schick Lecture.—Dr. Allan M. Butler, associate professor of pediatrics, Harvard Medical School, Boston, delivered the third annual Bela Schick Lecture, April 20, under the auspices of Mount Sinai Hospital. His subject was "Estimation and Parenteral Provision of Maintenance and Rehydration Requirements for Dehydrated Patients."

A Subcommittee on Industrial Medicine.—A Committee on Medicine and the Changing Order of the New York Academy of Medicine has created a subcommittee on industrial medicine consisting on April 26 of Drs. Anthony J. Lanza and Thomas D. Dublin. The purpose of the committee is to advance certain recommendations as to the developments that are indicated in the immediate future in the field of industrial health.

Physician Exonerated in Workmen's Compensation Inquiry.—Dr. Harry C. Stein, who was suspended for a year from rendering medical care under the workmen's compensation law as the result of the Moreland investigation in December 1943 on charges of having accepted "kickbacks," was exonerated by the appellate division and his suspension annulled newspapers reported. The evidence in the hearing failed to show that the physician had received any such "kickbacks."

Meeting on Health Education.—The revision of "Suggested School Health Policies" was the object of a conference at Teachers College, Columbia University, April 19-21, under the auspices of the National Conference for Cooperation in Health Education. The document "Suggested School Health Policies" is an attempt to integrate the views of many professional groups regarding various phases of school health programs. Dr. Charles C. Wilson, professor of health education, Teachers College, was chairman of the meeting, and Justus J. Schifferes, New York, of the National Committee on School Health Policies, the secretary. The following representatives of the national organizations, comprising the National Committee on School Health Policies, were among those who attended the meeting:

Dr. William E. Ayling, Syracuse, N. Y., American School Health Association.
Dr. Katherine Bain, Washington, D. C., Children's Bureau, U. S. Department of Labor.
Dr. William W. Bauer, Director, Bureau of Health Education, American Medical Association, Chicago.
Edward S. Evenden, Ph.D., New York, American Teachers College Association.
W. H. Lemmel, American Association of School Administrators, Washington, D. C.
S. S. Lifson, U. S. Public Health Service.
Ben W. Miller, Ph.D., American Association for Health, Physical Education and Recreation, Washington.
Dr. Harold H. Mitchell, Long Island, N. Y., American Academy of Pediatrics.
Dorothy B. Nyswander, Ph.D., New York, American Public Health Association.
Dr. Thurman B. Rice, Indianapolis, Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association.
Maycie K. Southall, Ph.D., Nashville, Tenn., Educational Policies Commission of the National Education Association.
Frank Stafford, M.A., U. S. Office of Education, Washington, D. C.
Alberta B. Wilson, R.N., National Organization for Public Health Nursing, New York.
J. M. Wisan, D.D.S., Elizabeth, N. J., American Dental Association.

Cornelius Rhoads Returns to Memorial Hospital.—Col. Cornelius P. Rhoads, M. C., since 1939 medical director of Memorial Hospital for the Treatment of Cancer and Allied Diseases, returned to his post April 15 after nearly two years' leave of absence, during which he was chief of the medical division of the Chemical Warfare Service of the Army of the United States. Dr. Rhoads is technically on leave until May 26, when he will be returned to "inactive status" subject to recall in case of emergency. On April 15 Major Gen. William N. Porter, chief of the Chemical Warfare Service, conferred on Dr. Rhoads the legion of merit for his work from June 1943 to April 1945, during which time he established the Toxicological Research Laboratory in the Edgewood Arsenal, Maryland, and the Medical Research Laboratory at Dugway Proving Ground, Tooele, Utah. He also established medical testing stations at Bushnell, Florida, and San Jose Island, Canal Zone. He developed new methods of diagnosis and treatment for the relief of injuries due to toxic chemicals, perfected a compound to counteract the effects of blister gas and all together perfected new technics and other contributions used beneficially during the war. Announcement was made also of a postwar development plan including the expansion of the hospital's present patient-care and laboratory research facilities and an extended clinical research and teaching program in cooperation with the city of New York through its contemplated hospital building for advanced cancer cases. This building will be erected on Memorial Hospital property adjacent to the present structure. The complete plant will provide 600 beds, the present capacity being 213.

OHIO

Prize for Essay on Premedical Education.—An award of $50 in war bonds was made to the Ohio Alpha Chapter of Alpha Epsilon Delta, national honorary premedical fraternity, at the Ohio State University, Columbus, for the prize winning essay "A Plan for Postwar Premedical Education," which the chapter submitted in an essay contest conducted by the fraternity's magazine, the *Scalpel*. On April 13 the award was presented by Maurice L. Moore, Ph.D., editor of the *Scalpel* and national secretary of Alpha Epsilon Delta, and director of the organic research division of Frederick Stearns & Company, Detroit, who lectured on "Sympathomimetic Agents."

Public Health Workshop.—A summer workshop in methods of visual communication will be given for the benefit of public health nurses by the Cleveland Health Museum. The workshop will be given for a three week period, June 18-July 6, at the Frances Payne Bolton School of Nursing, Western Reserve University, Cleveland. In announcing the course, Dr. Bruno Gebhard, the museum's director, stated that the workshop of the museum and its permanent and loan exhibits, study collections and health education reference material will be available to students. There will be a minimum of class instruction, and the students will work in small groups. The workshop is open to graduate registered nurses, especially those interested in public health, school and industrial nursing, and nurses in outpatient department and clinics, supervisors and teachers. Applications must be on file before June 1.

Advisory Tuberculosis Committee.—On April 12 Governor Frank J. Lausche named an advisory committee to assist in developing a state policy respecting tuberculosis. The members of the advisory committee comprise the membership of the advisory committee on coordination of tuberculosis programs of the Ohio Public Health Association. This committee has been at work on the problem for more than two years. The members of the governor's advisory committee are Drs. Roger E. Heering, Columbus, state director of health, chairman; Edgar C. Baker, Youngstown; Lynne E. Baker, Dayton; Willoughby D. Bishop, Greenville; Harold H. Brueckner, Lima; Charles A. Doan, Columbus; William D. Hickerson, Cincinnati; Clarence L. Hyde, Akron; Myron D. Miller, Columbus; Louis Mark, Columbus, Carl A. Wilzbach, Cincinnati; Joseph B. Stocklen, Cleveland, and John B. Hozier, Chicago. The lay members are W. K. Curfman, Cincinnati; Charron Payne, Columbus, Delmar R. Serafy, Canton, and Floyd A. Rowe, Cleveland.

PENNSYLVANIA

Eighty Years of Age.—Dr. Tempest C. Miller, Abbottstown, said to be the oldest practicing physician in Adams County, observed his eightieth birthday March 22. He has practiced in Abbottstown for fifty-six years.

Society News.—Dr. Donald Guthrie, Sayre, will address the Harrisburg Academy of Medicine May 15 on "Diagnosis and Treatment of Tumors of the Breast."——At a meeting of the Lackawanna County Medical Society in Scranton, May 15, Dr. Charles Alexander Hatfield, Philadelphia, will discuss "Some Newer Diagnostic and Therapeutic Aids in the Treatment of Peripheral Vascular Disease." The society will be addressed May 22 by Dr. Bernard J. Alpers, Philadelphia, on "Effects of the War in Regard to Psychoneurosis and Other Mental Conditions." On May 29 Dr. William H. M. Erb, Chester, will discuss "Present Day Treatment of Varicose Veins."

Course in Psychosomatic Medicine.—A graduate course in psychosomatic medicine for the internist and general practioner will be conducted at Temple University School of Medicine and Hospital, June 3-30. The instructors will include Drs. Edward Weiss, professor of clinical medicine, Oliver

Spurgeon English, professor of psychiatry, and Gerald H. J. Pearson, associate professor of psychiatry. The course is designed to assist internists and practitioners of general medicine in the diagnosis and management of psychoneurotic and psychosomatic problems. It is not intended for specialization in psychiatry. The course will consist of lectures, seminars, conferences and clinical work in wards and the outpatient department. Additional information may be obtained from Dr. William N. Parkinson, Temple University Hospital, 3401 North Broad Street, Philadelphia 40.

Philadelphia

Personal.—Dr. Ralph Pemberton, professor of medicine in the Medico-Chirurgical College Graduate School of Medicine, University of Pennsylvania, has been elected president of the Pan American League for the Study and Control of Rheumatic Diseases, according to *Science*.

Special Lectures.—Edwin J. Cohn, Ph.D., professor of biochemistry and head of the department of physical chemistry, Harvard Medical School, Boston, delivered the fifth annual Phi Delta Epsilon Honor Lecture, April 27, at the University of Pennsylvania School of Medicine. His subject was "The Separation of Blood Derivatives, Their Natural Functions and Their Clinical Uses."——Dr. Alfred Blalock, professor of surgery, Johns Hopkins University School of Medicine, Baltimore, gave the Phi Lambda Kappa Honor Lecture May 3 in the medical amphitheater in the Hospital of the University of Pennsylvania. His subject was "The Surgical Treatment of Certain Types of Disease of the Heart and Great Vessels."

TENNESSEE

Changes in Health Officers.—Dr. W. D. Burkhalter, Memphis, has resigned as assistant health officer of the Memphis and Shelby County Health Department, effective Dec. 31, 1944. Dr. Burkhalter, who will enter private practice, has been directing the child hygiene division and the crippled children service of the department since 1941.——Dr. John H. Morris, Pulaski, was recently elected health officer of Giles County to fill the unexpired term of the late Dr. James K. P. Blackburn.

Portrait of Walter Garrey.—On April 6 a portrait of Dr. Walter Eugene Garrey, professor emeritus of physiology, Vanderbilt University School of Medicine, Nashville, was presented to him by friends, students and associates. Dr. Frank H. Luton, professor of psychiatry at the medical school, presented the portrait, which was the work of Mrs. Frank Avent, local artist. The principal speaker was Howard J. Curtis, Ph.D., assistant professor of physiology, Columbia University College of Physicians and Surgeons, New York, who discussed "Excitation and Conduction in Nerve." Dr. Garrey had been a member of the faculty since 1925.

State Medical Election.—The Tennessee State Medical Association, during a business session of the house of delegates in Nashville, April 8, chose Dr. Charles M. Hamilton, Nashville, president-elect. Dr. William C. Chaney, Memphis, was installed as president to succeed Dr. Kyle C. Copenhaver, Knoxville. Dr. Harrison H. Shoulders, Nashville, secretary-editor of the association for the past seventeen years, resigned. The board of trustees of the association was empowered to name a temporary successor. Dr. Shoulders first declined the nomination, but in a spontaneous expression of appreciation for his service the delegates insisted on his election prior to acceptance of his resignation, according to the Nashville *Banner*.

WISCONSIN

Academy of Surgery.—On May 23 the Wisconsin Academy of Surgery will conduct a program at the St. Mary's Hospital, Racine, with the following speakers, all of Racine:

Dr. William R. Kreul, Curare as an Adjunct in Anesthesia.
Dr. Louis E. Fazen Jr., Surgical Management of Thrombophlebitis, with Case Report.
Dr. Edmund W. Schacht, Report on Gallbladder Surgery at St. Mary's Hospital.
Dr. Kenneth C. Kehl, Mechanism of Reflex Pain Originating in the Gall Duct System Causing Cardiac Pain.
Dr. Frederick C. Christensen, Plastics on the Breast—Presentation of Case.
Dr. Russell M. Kurten, Presentation of Cases of Skin Grafting in Trauma and Burns.

Dr. Geza de Takats, Chicago, will address the dinner session in the evening on "Thromboembolism."

Conference on Poliomyelitis.—May 24 has been tentatively selected as the date for a statewide conference of city health officers on poliomyelitis. The meeting will be in Milwaukee under the auspices of the state board of health and the local representatives of the National Foundation for Infantile Paralysis. Among the speakers will be Dr. John L. Lavan, Toledo, Ohio, director of research for the medical foundation. One of the objectives of the conference is to clarify thinking on the matter of area or regional age level quarantines, provisions for care of poliomyelitis cases, transportation facilities, follow-up of cases and related problems, the last to assist in a proposed uniform pattern of action by health officers throughout the state.

ALASKA

Basic Science Law Defeated.—*Northwest Medicine* announce the failure to pass a bill creating a basic science law, prepared by a professional bill writer and containing several mistakes that were not caught until after its introduction. The bill was passed by the senate but did not carry any appropriation for expenses of operating a board. It was tabled in the house until the last night of the session. During the second reading of the bill, an amendment providing membership on the board to consist of three nonmedical and two medical persons was passed. The senate asked the house to recede from this amendment, the house refused and the senate let the bill die, according to *Northwest Medicine*.

Mobile Health Boat.—A mobile health unit vessel, *Hy Gene*, has been placed in operation for southeastern Alaska, supported by federal funds, to provide medical, nursing, x-ray, diagnostic, laboratory and sanitary services to many areas that have heretofore received little or no public health education. The vessel is equipped with x-ray and bacteriologic laboratories for diagnosis of tuberculosis, contagious diseases and control of epidemics. Dr. N. Berneta Block, director of the division of maternal and child health and crippled children's services, Juneau, has been temporarily appointed physician in charge. Mrs. Magnhild Oygard Bogue has been appointed nurse-technician, and at intervals a department sanitarian will join the staff for sanitary inspections in outlying areas.

GENERAL

National Noise Abatement Week.—April 29-May 5 was designated National Noise Abatement Week and devoted to the theme "Prescription for War Nerves—Stop Needless Noise—Keep Fit, Keep Well, Keep Working." The National Noise Abatement Council, 9 Rockefeller Plaza, New York, serves to promote the national consciousness for the elimination of needless noise.

Meeting of Medical Service Representatives.—Twenty-two representatives from Michigan, Indiana, Missouri, Iowa, Wisconsin and Illinois convened at the Palmer House April 22 with Dr. Charles H. Phifer, Chicago, chairman of the committee on the study of prepayment plans for medical and surgical care of the Illinois State Medical Society, presiding. Various problems were discussed.

Examinations in Ophthalmology.—The American Board of Ophthalmology will hold an examination in Los Angeles next January. It is expected that the examination dates will coincide with the dates of the midwinter course sponsored by the Research Study Club of Los Angeles, these dates to be announced later. Applications for this examination must be filed before September 1. For details prospective candidates should write at once to Dr. S. Judd Beach, secretary, Cape Cottage, Maine.

Narcotic Violations.—The U. S. Bureau of Narcotics announces the following actions:

Dr. Alpheus C. Koon, Lakeland, Fla., following his plea of guilty in the U. S. District Court at Tampa to the false execution of narcotic prescriptions, received on March 8 a prison sentence of two years and one day. The sentence was suspended and he was placed on probation for a period of five years.

Dr. Matthew Arnow, Jacksonville, Fla., pleaded nolo contendere in the U. S. District Court at Jacksonville to the false execution of narcotic prescriptions and received on March 26 a suspended prison sentence and was placed on probation for three years.

Joint Committee on Health Problems in Education.—The annual meeting of the joint committee on health problems in education of the National Education Association and the American Medical Association was held at the American Medical Association, May 8-9, to consider, among other subjects, the revision of "Suggested School Health Policies," school luncheons and health implications of a uniform military training program if adopted. Guests at the meeting included Dr. Roscoe L. Sensenich, South Bend, Ind.; Dr. Charles C. Wilson, professor of health and physical education, Teachers College, Columbia University, New York; Ruth Grout, Ph.D., associate professor of education, University of Minnesota, Minneapolis, and Col. Leonard G. Rowntree, M. C.

Tri-State Tuberculosis Group Formed. — The recent creation of the Association for the Rehabilitation of the Tuberculous is announced in the *Bulletin of the National Tuberculosis Association* for March. The new group includes the states of New York, New Jersey and Connecticut and aims to study the common problems and the development of work programs. Officers of the association are Marion C. Moore, rehabilitation secretary, Bergen County (N. J.) Tuberculosis and Health Association, president; Joseph Newman, educatioinal director, Municipal Sanatorium, Otisville, N. Y., vice president; Irma Minges, rehabilitation secretary, New York Tuberculosis and Health Association, secretary, and Walter Wenkert, rehabilitation service, National Tuberculosis Association, treasurer.

Physician Impersonated by Impostor.—Dr. René Bine, San Francisco, writes that a man has been traveling about the country using the name of his son, Dr. René Bine Jr., who is now serving overseas as a captain in the medical corps of the Army of the United States. One report describes the impostor as about 6 feet in height and weighing about 175 pounds; dark brown hair, gray blue eyes with a slight cast in the left eye. He appeared to be about 45 years old. The impostor seems to have a good background of medicine and carried a bag on which was printed "Dr. Rene Bines Jr., Grace Hospital, Detroit." Dr. Bine asks that persons be on the lookout for the impostor, pointing out that his son, who graduated at Stanford University School of Medicine, San Francisco, in 1941, is 29 years old and has been overseas thirty months.

Courses to Prepare Instructors in Sight-Saving.—The National Society for the Prevention of Blindness announces that five colleges and universities are cooperating with it in offering special courses for the preparation of supervisors, teachers, nurses and social workers and others concerned with the education of the partially seeing child. Elementary courses are being offered at Wayne University, Detroit, June 18-July 27; University of Wisconsin, Madison, June 25-August 17; and Teachers College, Columbia University, New York, July 2-August 10. Special short courses are being given at the University of Oregon, Eugene, June 18-July 27 and Indiana State Teachers College, Terre Haute, Ind., June 3-June 23. Additional information may be obtained from the National Society for the Prevention of Blindness, 1790 Broadway, New York.

Grants by Sugar Research Foundation. — Six grants amounting to $45,400, which were announced by the Sugar Research Foundation, April 16, include:

Pauline B. Mack, Ph.D., and associates of the Ellen H. Richards Institute, Pennsylvania State College, State College, Pa., $20,000 for one year, to measure the effect of high and low sugar containing diets on the health, growth and physical condition of children. In recommending this grant, Robert C. Hockett, Ph.D., scientific director of the foundation, pointed out that the institute has a collection of measurements and records from a mass nutritional study of 9,000 subjects which is probably not duplicated anywhere else.

Dr. Rachmiel Levine, director of metabolic and endocrine research, Michael Reese Hospital, Chicago, $7,500 for one year, to study the physiologic behavior of levulose, a sugar produced by inversion of ordinary sugar.

Dr. Israel L. Chaikoff, associate professor of physiology, University of California, Berkeley, $7,400 for two years, to study the protective action of sugar against cirrhosis of the liver.

Natural Resources Research Institute of the University of Wyoming, Laramie, $4,000 for one year, to investigate utilization of pectin from the pulp of sugar beets and to study derivatives of beet pectin.

Dora Stern, literature consultant, $4,000 for one year, to devise a system for classifying sugar derivatives and to compile a list of new derivatives discovered since 1930.

Dr. Israel M. Rabinowitch, McGill University Faculty of Medicine, Montreal, $2,500 for one year, to study further the body's relative rate of absorption of sucrose, dextrose and levulose.

The foundation members include growers and processors of beet and cane sugar from the continental United States, Hawaii, Puerto Rico, Cuba, Canada and Haiti. Joseph F. Abbott, New York, is president.

Foundation for Tropical Medicine.—At the recent annual meeting of the American Foundation for Tropical Medicine Col. Thomas T. Mackie, M. C., was reelected president. Other officers include Dr. Henry E. Meleney, New York, vice president; Mrs. C. James Attarian, New York, acting secretary; Mr. William W. Lancaster, New York, treasurer, and Lee T. Melly, New York, executive director. During 1944 the foundation received $47,350 from twenty-five sources toward the work of the foundation, according to *Tropical Medicine News*. Eleven grants totaling $38,767 were made, of which seven were to medical schools in this country for the continuation of undergraduate teaching in tropical medicine, for research and for paying the expenses of technical assistance and supplies for teaching. The largest single contribution was made to the Tulane University of Louisiana School of Medicine, New Orleans, for budgetary needs of its department of tropical medicine. Another medical school was given financial assistance to provide a month's training for a technician at the Army Medical School in the latest technics of tropical medicine and parasitology. One of the most important contributions was to Duke University School of Medicine, Durham, N. C., for the establishment of a registry for mycotic diseases. A grant by the John and Mary R. Markle Foundation was made through the foundation to the Army Medical Museum for continuation of its preparation and distribution of teaching material in tropical medicine and medical parasitology.

CANADA

Chilean Physician Named to International Labor Office. — Dr. Marcos Charnes, Santiago, Chile, has been appointed scientific officer of the industrial hygiene service of the International Labour Office, Montreal, effective sometime in May. The position of director of this service had not yet been filled on April 28. The International organization still maintains a small staff in Geneva, Switzerland, and branch offices in Washington, London, Paris, New Delhi and Chungking.

PUERTO RICO

Proposed Medical Construction.—The Superior Educational Council of the University of Puerto Rico recently approved plans to establish a school of medicine and a school of nurses. The decision called for four "minimum guâranties" before the medical school could be projected: the construction and equipment of an adequate building for the school, the establishment of a modern 300 bed hospital in connection with the school, the selection and preparation of the faculty and technical personnel, and provision of necessary funds for operation of the school and hospital. An announcement indicated that the establishment of the school of medicine will have to wait until after the war but that the school of nurses would be constructed this summer. The four year course will consist of two years of academic studies and two years of clinical work, the latter to be conducted at the Bayamon district hospital. To offset the expenses of building and operating a medical school, it has been suggested that a scholarship fund be created to send fifty students each year to schools of medicine in the United States and Latin American countries (THE JOURNAL, May 27, 1944, p. 298, and Aug. 26, 1944, p. 1202). On April 26, in a special communication to the American Medical Association, it was stated that Governor Tugwell had vetoed a bill passed by the legislature to establish a school of medicine at the city of Ponce. The bill appropriated $400,000 for the proposed medical school but the governor, in a letter sent to Mayor Andres Grillasca of Ponce, stated that he would not approve the bill solely because he believed that it controverted the spirit of the University Statute of 1942, at which time a hard fight was made to make as certain as possible not only that the university should be exempt from partisan politics and patronage but that it should be lifted above controversies of any kind. The governor said that he would be naive if he "did not conclude from the nature of your campaign that you were trying to bring the school of medicine to Ponce for the sake of the city rather than for the good of the university." The city of San Juan was also campaigning to get the proposed school of medicine established at Rio Piedras, within the metropolitan area of the capital of the island. The governor in his letter to Mayor Grillasca stated that he could not "join an attempt to divide prosperity and prestige among competing communities." He added "I am not objecting to the establishment of the medical school at any site, including Ponce, I disapproved because I feel strongly that the university statute ought to be strengthened rather than weakened, and because this bill would lead definitely to its weakening." The controversy on the site for the proposed medical school arose when the Popular Democratic party, controlling the legislature, passed the bill with the understanding that the buildings for the school should be erected in Ponce. Puerto Rico, therefore, will not have this year the proposed school of medicine.

Deaths in Other Countries

Raymond C. Shannon, American entomologist and malarial expert, was found dead March 7 in his hotel in Port of Spain, Trinidad, aged 51.——**Sir Hubert Bond,** authority on mental diseases, died in Lancashire, England, aged 74.

Foreign Letters

LONDON

(From Our Regular Correspondent)

April 7, 1945.

The Promotion of Medical and Scientific Research in India

The physiologist A. V. Hill, secretary of the Royal Society, has visited India at the invitation of the government there to discuss and advise on Indian scientific research problems. The result is a valuable report by the only British scientist who has ever been asked to offer advice on a subject of tremendous importance for a subcontinent occupied by hundreds of millions of peoples, many with advanced oriental civilizations which are being rapidly modified by European culture. Professor Hill finds that there is great need for reforms. An Indian scientific office should be set up in London with specialists in various subjects, including medicine, representative Indian scientists should be attached to the British Commonwealth Scientific Office in Washington, and young Indian teachers and research workers should be given facilities for advanced study abroad, especially in Britain. The medical colleges should have full time teachers and research workers in all subjects. He recommends the establishment in Delhi of an all India medical center where selected students should be trained and receive financial aid in the form of scholarships. Such a center must be free from all racial, religious, political or provincial bias. Its purposes should be to provide the best type of teacher and research worker and thereby to foster throughout India a high standard of medical practice. He also recommends a special hospital for the clinical study of malaria and the bringing of existing research institutes into closer touch with the medical colleges.

To facilitate scientific research in general, Professor Hill wants to see a central organization under a minister without departmental duties. This organization should have six boards charged with research respectively in medicine, agriculture, industry, natural resources, engineering and defense. The director and principal administrative officer of each board should be ex officio a member of the other five, so as to maintain the closest liaison. There should be formed an Indian central register for scientific and technical personnel, and a central scientific academy, the equivalent of the Royal Society, he said. As scientific work in universities is the basis of progress in science, grants are necessary, and medicine and biology are the two subjects which badly need these. But Professor Hill feels the drawbacks of making research an entirely government subsidized affair, and the need for enlisting private benevolence in the endowment of scholarships and fellowships and other means whereby research is assisted.

The Improvement of Hospital Meals

Much dissatisfaction has been expressed with hospital meals, which are described as too monotonous and unappetizing. The subject has been taken up by the Ministry of Health, which has made recommendations to the hospital authorities. Official visits were paid to hospitals of various types by representatives of the Ministries of Health, of Labor and National Service and of Food. On their recommendations, suggestions for improved catering and feeding are based.

The minister of health, Mr. Willink, points out that the provision of hospital food necessitates a scientific approach, which involves questions of judicious purchasing, good cooking, palatability and the attractive presentation of the prepared food so as to ensure the nutritional requirements of all patients. An important recommendation is that a special committee might be appointed to deal with this side of hospital management, each of the various branches being represented. In larger hospitals it is recommended that catering be in charge of a full time officer suitably trained. In the smaller hospitals the work should be combined with the duties of another officer, or, alternatively, a full time officer should supervise and advise on catering in a group of hospitals. Other suggestions are made for planning and training courses. Fuller advantage might be taken of the advisory dietetic service of King Edward's Hospital Fund, as well as the expert staffs of the Ministry of Health in the regular visiting of hospitals.

Prevention of Malaria on Board Ship by Means of a Mosquito Repellant

A new measure for the prevention of malaria on board ships calling at malarious ports has been adopted. Ships going to tropical African ports and the East Indies must now carry a supply of dimethyl phthalate to be issued to the crew as a protection against mosquitoes when the vessel is in a malarious area. The instructions are that a few drops are to be applied to the exposed parts of the body, avoiding areas around the eyes and mouth, and to the clothing if the mosquitoes are biting through it. One application lasts four hours.

PARIS

(From Our Regular Correspondent)

March 25, 1945.

Anesthesia in War

According to a communication of Curtellet, consulting physician of the first French army, two modes of anesthesia are principally utilized in the primary evacuation hospitals, which receive the wounded directly from the combat line several hours after the wound has been received. These two methods are those of intravenous injections of pentothal and that of protoxide-ether in a closed circuit. These are delicate technics, but special centers for training in anesthesia have been so well organized that a total of 2,340 anesthesias of which 1,979 were done with pentothal did not result in a single miscalculation.

After numerous trials the mode of administration has been regulated in the following manner: The initial dose varies between 0.6 and 0.7 Gm. Then 0.1 Gm. is given successively when the patient becomes active. Under these conditions a perfect anesthesia of one or two hours will not require more than from 1.5 to 2 Gm. The only inconveniences of anesthesia with pentothal may consist in a laryngeal spasm due to the stimulation of the vagal irritability; sometimes, by reduction of the excitability of the bulbar respiratory centers, there may be a respiratory arrest lasting several seconds, which ceases after the immediate administration of oxygen under pressure. The grave syncopes are avoided by the system of fractionated doses. However, there are several contraindications; pentothal should not be employed in operations on the face, the neck and the mediastinum. It is not advisable for patients with severe anoxic shock or for those with abdominal wounds. On the other hand, it is satisfactory in those with cranial lesions and with wounds of the extremities. If this mode of anesthesia is used, it is indispensable to have on hand nikethamide as an antidote against the barbiturates, atropine against possible convulsive accidents and finally oxygen under pressure. Anesthesia with protoxide-ether-oxygen in closed circuit is preceded by a basal anesthesia, for instance by the intravenous administration of morphine. This anesthesia is advisable in all cases in which pentothal is contraindicated.

Colchicine and Cancer

Certain drugs, such as the alkaloids of the colchicine type, provoke abnormal mitoses and blockages of karyokinesis which end in the degeneration of cells rather than in their division. This property has made it possible to obtain in mice regression and even disappearance of tumors of the type of lymphoid

sarcoma. Similar results have been obtained on malignant and papillomatous tumors produced in rabbits by the virus of Shope.

However, in order to obtain these results toxic doses of colchicine are necessary. Nevertheless the usually tolerated doses, which produce only an elevation of the karyokinetic index without either blockage or degeneration of the cells, cause a sensitization of the cells to radiations. The cellular radiosensitivity is in fact related to the process of division.

Mallet reported at the Société of d'électrologie et de radiologie the results which he obtained on cancers of diverse localization by employing intravenous injections of colchicine from ten to twelve days before the application of roentgen therapy. Epitheliomas of the pharynx, larynx and tonsils seemed to regress more rapidly than with exclusive roentgen therapy. Cancers of the breast with cutaneous generalizations have been rapidly influenced: with a dose of 400 roentgens the nodules disappeared in about fifteen days. However, caution is necessary, because of the toxicity of colchicine, which causes agranulocytosis, diarrhea and febrile attacks.

These complications have induced Calvet, who discussed this question before the Société de chirurgie de Toulouse, to employ colchicine only in situ. Calvet stresses among other difficulties the difficulty of rendering a definite judgment about the cures possible by the combination of colchicine and radiations, because this therapy is relatively new. However, the results reported encourage the continuation of experiments with these karyokinetic poisons.

Chronic Rheumatoid Arthritis and the Nervous System

Charcot attributed the deformity of chronic rheumatoid arthritis to a reaction of the originally impaired nervous system, and more recently May and Laffite have identified a trophoneurotic type of rheumatic arthritis. A study of 16 cases of chronic rheumatoid arthritis led Martin to the following conclusions, which were presented before the Société médicale de Genève:

1. Certain disorders of the diencephalon, such as Parkinson's disease, assume the traits of a rheumatoid disorder before revealing their character as a disease of the nervous system.

2. A succession of purely nervous symptoms is frequently observed to dominate the clinical picture in certain cases of rheumatoid arthritis.

3. In a large number of cases of chronic rheumatoid arthritis neurologic signs are observed, such as modification of the reflexes, trophic disturbances, trembling, insomnia, cachexia, disturbances in the blood composition, disturbances of the regulation of the carbohydrates and even tetanic or fainting attacks.

The question arises whether the morbid element has its primary or secondary localization in the brain. At present the problem of the nervous origin of chronic rheumatoid arthritis remains unsolved.

Death of French Physicians

French medicine deplores the loss of a number of important scientists since 1940. Among them are Professors J. L. Faure, A. Gosset, Cuneo, Pierre Duval, Rathery, Sergent, Achard and Nobécourt, Dean Spillmann, de Nancy, d'Arsonval, Tréfouel, director of the Institute Pasteur of Paris, Claude Regaud, founder of the Radium Institute, Marchoux and Yersin both of the Institute Pasteur, Armand Carrel and Bandelac de Pariente.

Professor Roussy, member of the institute, who had been rector of the University of Paris at the onset of the war, has been recalled to that office. He has also been elected general secretary of the Académie de médecine.

BRAZIL

(From Our Regular Correspondent)

São Paulo, April 3, 1945.

Medical Meetings

Two important medical congresses were held at São Paulo early in March. Many Brazilian doctors assembled to commemorate the fiftieth anniversary of the foundation of the Sociedade de Medicina e Cirurgia de São Paulo. The meeting was presided over by Prof. Carlos Gama of the department of neurology of the Faculdade de Medicina de Salvador, Baia. The official themes of the congress were "Arterial Hypotension" and "The Problem of the Hospital in São Paulo." The first was discussed by Prof. Aloysio de Castro, president of the National Academy of Medicine of Rio de Janeiro, and by Dr. J. Mesquita Sampaio, clinician in São Paulo. The question of hospital organization was discussed by Prof. Benedito Montenegro, director of the Faculdade de Medicina de São Paulo, and by Prof. Godoy Moreira, director of the Hospital das Clinicas of the same faculty. The problem of the rural hospitals was considered by Dr. Gama Rodrigues, a well known physician of Lorens. The congress devoted special sessions to the discussion of papers on trachoma, tuberculosis and rheumatism. Many other communications on other subjects were presented.

The other meeting was the first Congresso Medico-Social Brasileiro. The assembly was presided over by Prof. Antonio Candido de Camargo of the Faculdade de Medicina de São Paulo. Its program included the following items: (1) legal regulation of medical work in the hospitals; (2) legal regulation of medical work in private organizations; (3) the medical work in the industrial organization; (4) the medical work in the country zones; (5) insurance against diseases; (6) order of doctors; (7) providence institute; (8) assistance to parentless boys; (9) assistance to delinquent boys; (10) prenuptial medical examination; (11) medical assistance to country people; (12) standard medicine for poor people. All the topics were widely discussed. The conclusions of the congress were submitted to the governmental study.

Blood Groups Among Indians

There are many differences in the blood groupings of Brazilian Indians, when compared to the general population of North and South America. Although Drs. L. Ribeiro W. Berardinelli and M. Roiter had obtained only group O in 107 "guaranis" living in the south of Brazil, in 61 "carajás" of the north of that country Dr. Golden obtained 24 of group O, 3 of A, 31 of B and 3 of AB.

In 237 Indians from northeast Brazil Drs. E. Bioca and F. Ottensooser found only individuals belonging to group O. An examination of 50 Indians known to have or supposed to have some white blood, in the region of the Alto Rio Negro in the Estado do Amazonas, showed O 36, A 12, B 2 and AB O. These investigations confirm the data obtained by Blackfeet in the United States, Mazza in Argentina and Larreta in Peru, showing the preponderance of group O among Indians in America.

Marriages

William Revere Wellborn Jr., Elkin, N. C., to Miss Lola Margaret Holcomb of Jonesville in Greenville, S. C., March 19.

John Warren Reid, Mill City, Ore., to Miss Josephine Gresham Lockhart of Galveston, Texas, April 7.

Arthur B. Shaul Jr., Cleveland, to Miss Mary Frances Hinds at Hudson, Ohio, March 8.

Harry S. Gradle to Miss Audrey Hayden, both of Chicago, April 28.

Deaths

Alfred Gibson Farmer ✦ Dayton, Ohio; Kentucky University Medical Department, Louisville, 1904; from 1905 to 1915 engaged in medical service in the Panama Canal for the United States government, serving as physician at Gorgas Hospital at Panama, as district physician at Gatun, Corozal and Cristobal and as chief of the medical service in Colon Hospital; during World War I medical officer and post surgeon with rank of major, aviation service, U. S. Army, Wilbur Wright Aviation Field, and medical officer at the Army and Navy General Hospital in Hot Springs National Park, Ark.; lieutenant colonel, medical reserve corps, U. S. Army, not on active duty; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology and the Aero Medical Association; fellow of the American College of Surgeons; past president of the Montgomery County Medical Society; medical examiner for the Civil Aeronautics Authority; member of the staffs as ophthalmologist at the St. Elizabeth's and Good Samaritan hospitals; in 1935 chief of staff and since 1919 ophthalmologist of the Miami Valley Hospital, where he died April 2, aged 67, of cerebral hemorrhage.

Louis Fischer ✦ New York; University of the City of New York Medical Department, 1884; secretary of the Section on Diseases of Children, 1899-1900, and Affiliate Fellow of the American Medical Association; specialist certified by the American Board of Pediatrics, Inc.; member of the American Academy of Pediatrics; formerly instructor in diseases in children at the New York Post-Graduate Medical School and Hospital; served on the staffs of the Sydenham, Willard Parker and Riverside hospitals in New York, and St. Vincent's Nursery and Babies Hospital in Montclair, N. J.; author of "Infant Feeding in Health and Disease," the "Health-Care of the Baby," "Diseases of Infancy and Childhood" and "Health-Care of the Growing Child"; died April 9, aged 80, of coronary thrombosis.

Albert Earle Boozer ✦ Columbia, S. C.; University of Pennsylvania Department of Medicine, Philadelphia, 1892; since 1909 a member of the South Carolina State Board of Medical Examiners, serving as its secretary from 1911 to 1943 when he resigned; on the first board of physicians of Columbia Hospital; until a few years ago, when he resigned, served as medical director and examiner for the Carolina Life Company for about twenty years; assistant medical referee with the Mutual Life Insurance Company and medical referee of the Missouri Life Insurance Company, serving as examiner for twenty-five other insurance companies; died in Asheville, N. C.; March 1, aged 76, of generalized arteriosclerosis.

Sanders Lewis Christian ✦ Medical Director, U. S. Public Health Service, retired, New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1912; fellow of the American College of Surgeons; served overseas during World War I and with the consular service in a medical capacity for many years, serving in London, Paris and Belgium; formerly assistant surgeon general and chief of the hospital division, U. S. Public Health Service; medical officer in charge of the U. S. Marine Hospital in San Francisco from 1940 to 1944, when he retired; died in the U. S. Marine Hospital March 9, aged 56, of acute peritonitis following perforation of a duodenal ulcer.

Claude William Asbury, Hymera, Ind.; Illinois Medical College, Chicago, 1903; formerly on the staff of the Union Hospital in Terre Haute; on the staff of the Mary Sherman Memorial Hospital, Sullivan; served during World War I; died in March, aged 67, of cerebral hemorrhage.

John K. Berk, Frackville, Pa.; Jefferson Medical College of Philadelphia, 1896; member of the American Medical Association; director of the First National Bank; member of the board of trustees of the Wernersville State Hospital in Wernersville; for many years surgeon for the Philadelphia and Reading Coal and Iron Company; company doctor for the Bell Telephone Company; member of the Rotary Club; died in the Pottsville Hospital, Pottsville, March 22, aged 73, of coronary thrombosis and renal insufficiency.

William Andrew Borders, Armuchee, Ga.; Atlanta Medical College, 1890; member of the American Medical Association; honorary member of the Medical Association of Georgia; on the staffs of the Harbin Hospital, McCall Hospital and the Floyd County Hospital in Rome, where he died January 15, aged 78, of cerebral hemorrhage.

Victor McMurry Brian ✦ Lawrenceville, Ill.; George Washington University School of Medicine, Washington, D. C., 1917; served during World War I; on the staff of the Good Samaritan Hospital, Vincennes, Ind.; died in St. Louis March 27, aged 53, of cerebral hemorrhage.

Elmer Lee Burch, San Jose, Calif.; College of Physicians and Surgeons of San Francisco, 1905; died in the Alameda Hospital, Alameda, February 6, aged 75.

George M. Dill ✦ Prescott, Wis.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; died in St. Paul, January 30, aged 74, of uremia.

Henry Clay Eargle, Dublin, Texas; Fort Worth School of Medicine, Medical Department of Fort Worth University, 1905; died February 5, aged 62, of cardiac decompensation and arteriosclerosis.

Charles Henri Evans, Danville, Ill.; Illinois Medical College, Chicago, 1905; member of the American Medical Association and the Colorado State Medical Society; served with the British army during World War I; died in St. Elizabeth Hospital March 26, aged 69, of hypostatic pneumonia.

Abraham Judson Forman, Milwaukee; Marquette University School of Medicine, Milwaukee, 1936; member of the American Medical Association; interned at St. James Hospital in Butte, Mont.; began active duty as a captain in the medical corps, Army of the United States, on July 15, 1942; service terminated March 12, 1943; on the staffs of the Columbia, Mount Sinai and St. Mary's hospitals; died in a Port Washington hospital March 15, aged 40, of a skull fracture received in an automobile accident near Mequon.

Charles C. Gafford, Wymore, Neb.; College of Physicians and Surgeons, Keokuk, Iowa, 1881; member of the American Medical Association and honorary member of the Nebraska State Medical Association; died February 1, aged 86, of senility.

John T. Garland, Macon, Ga.; Vanderbilt University School of Medicine, Nashville, Tenn., 1878; died February 18, aged 88, of coronary occlusion.

Leigh Daniel Gillespie, Ardmore, Okla.; Baylor University College of Medicine, Dallas, Texas, 1904; member of the American Medical Association; died January 4, aged 75.

William W. Gregory ✦ Stevens Point, Wis.; Rush Medical College, Chicago, 1897; member of the staff of St. Michael's Hospital; died in Madison January 30, aged 75, of cerebral hypertension.

George H. Grimmell Jr., Howard, Kan.; Barnes Medical College, St. Louis, 1896; member of the American Medical Association and honorary member of the Kansas Medical Society; died January 30, aged 89, of chronic myocarditis.

Fred William Hall ✦ Chicago; Indiana University School of Medicine, Indianapolis, 1926; interned at the Methodist Hospital in Indianapolis; died March 14, aged 50.

Claud Cleburne Hardison, Lewisburg, Tenn.; University of Nashville Medical Department, 1890; Vanderbilt University School of Medicine, Nashville, 1890; died February 27, aged 75, of heart disease.

Frederick Smith Heller, Oakharbor, Ohio; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1888; member of the American Medical Association, for many years physician for the Ottawa County Home; served on the staff of the Magruder Hospital, Port Clinton; in 1938 received a gold plaque from the Ottawa County Medical Society in honor of his fifty years of practice; died February 27, aged 81, of cerebral hemorrhage.

Carl Gottfried Johnson, Galesburg, Ill.; Long Island College Hospital, Brooklyn, 1892; member of the American Medical Association; in 1943 was made a member of the "Fifty Year Club" of the Illinois State Medical Society; served as a member of the city council and as commissioner of health; on the staff of the Galesburg Cottage Hospital; for many years a trustee of the Augustana College in Rock Island; died March 20, aged 80, of coronary thrombosis.

Harry Norton Kelley ✦ Worcester, Mass.; Harvard Medical School, Boston, 1925; on the staff of St. Vincent's Hospital; died February 20, aged 45, of coronary thrombosis.

James Samuel King ✦ St. Albans, Vt.; University of Vermont College of Medicine, Burlington, 1893; honorary member of the Vermont State Medical Society; served during World War I; died January 7, aged 74.

Charles Franklin Kivlin ✦ Troy, N. Y.; Albany Medical College, 1898; served as district supervisor of the U. S. Public Health Service; on the staffs of St. Joseph's Maternity Hospital and the Troy Hospital, where he died March 21, aged 69, of coronary occlusion.

John Moser Kuhns, Freeburg, Pa.; Medico-Chirurgical College of Philadelphia, 1896; member of the American Medical Association; died in the Community Hospital, Sunbury, January 24, aged 73.

Lewis A. Ledford, Chattanooga, Tenn.; Southern College of Medicine and Surgery, Atlanta, 1914; at one time on the staff of the Chattanooga Hospital; died February 5, aged 68, of carcinoma.

William Duncan Mackechnie, Indianola, Neb.; Western University Faculty of Medicine, London, Ont., Canada, 1899; died in Boulder, Colo., March 4, aged 67, of cerebral hemorrhage.

John Henry Moore, Boston; Harvard Medical School, Boston, 1897; member of the American Medical Association; for many years medical examiner for the John Hancock Mutual Life Insurance Company; died in the Baker Memorial Hospital February 24, aged 75, of hypertensive heart disease and fracture of the right femur incurred in a fall.

Risdon Dent Moore, Springfield, Tenn.; Vanderbilt University School of Medicine, Nashville, 1890; member of the American Medical Association and honorary member of the Tennessee State Medical Association; served as city health officer; died in the Robertson County Hospital January 9, aged 87.

James Coleman Morehead, Flat Lick, Ky.; Louisville Medical College, 1902; died January 1, aged 69, of coronary thrombosis.

Samuel Murdock ✠ Sabetha, Kan.; Kansas City (Mo.) Medical College, 1893; fellow of the American College of Surgeons; established the Sabetha Hospital, which he gave to the Sisters of the Order of St. Joseph and which is now known as St. Anthony Murdock Memorial Hospital, serving as its medical director; died February 26, aged 73, of myocardial failure.

Frank Blair Murphy ✠ Akron, Ohio; Medical College of Virginia, Richmond, 1895; served on the staff of the People's Hospital, where he died March 30, aged 76, of cerebral hemorrhage.

Samuel Casper Murphy ✠ Warsaw, Ind.; Indiana University School of Medicine, Indianapolis, 1910; served during World War I; medical superintendent of the Murphy Hospital; died February 10, aged 59, of lymphosarcoma.

John A. Murray, Patton, Pa.; University of Maryland School of Medicine, Baltimore, 1885; Jefferson Medical College of Philadelphia, 1893; member of the American Medical Association; fellow of the American College of Surgeons; also a pharmacist; consulting surgeon and for many years surgical chief, Miners' Hospital of Northern Cambria, Spangler, which he assisted in establishing; a founder of the Clearfield Hospital in Clearfield; formerly U. S. Pension examiner; died February 27, aged 86, of chronic nephritis.

Robert Offenbach, Margate City, N. J.; University of the City of New York, 1879; died in the Atlantic City Hospital, Atlantic City, February 8, aged 85, of gastrointestinal hemorrhage from a ruptured duodenal diverticulum.

Robert Abner Partain, San Antonio, Texas; University of Texas School of Medicine, Galveston, 1927; member of the American Medical Association; served an internship at the Charity Hospital of Louisiana in New Orleans and a residency at the Central Louisiana State Hospital in Pineville, La.; on the staffs of the Robert B. Green Memorial Hospital and the Medical and Surgical Memorial Hospital, where he died February 15, aged 46, of coronary occlusion.

Franklin James Pattenden ✠ Asbury Park, N. J.; Long Island College of Medicine, Brooklyn, 1935; interned at the Fitkin Memorial Hospital in Neptune; died January 27, aged 34, of accidental carbon monoxide poisoning due to illuminating gas.

Edwin Francis Pierce, Lewiston, Maine; Columbia University College of Physicians and Surgeons, New York, 1901; member of the American Medical Association; surgeon on the consulting staff of the Central Maine General Hospital, where he died February 2, aged 72, of coronary thrombosis.

Frank McClung Postlethwaite ✠ Kansas City, Mo.; University Medical College of Kansas City, 1913; on the staffs of St. Joseph's, Kansas City General, St. Mary's, St. Luke's and Trinity Lutheran hospitals; died March 22, aged 61, of coronary thrombosis.

Joseph Henry Potts, New Britain, Conn.; Dartmouth Medical School, Hanover, N. H., 1905; resigned in April 1934 as chairman of the board of park commissioners; director of the New Britain Memorial Hospital; on the staff of the New Britain General Hospital, where he died March 24, aged 65, of cerebral hemorrhage.

Charles Jacob Price, Mount Morris, Ill.; the Hahnemann Medical College and Hospital, Chicago, 1900; served in France during World War I; major, medical reserve corps, U. S. Army, not on active duty; died March 20, aged 70, of coronary occlusion.

Oscar Frank Reinhardt, Mascoutah, Ill.; Chicago College of Medicine and Surgery, 1908; member of the American Medical Association; served during World War I; died in St. Elizabeth Hospital, Belleville, March 11, aged 59, of bronchiectasis.

Carl Emery Richards, Sumner, Wash; University of Louisville Medical Department, Louisville, Ky., 1907; died February 13, aged 68.

Ernest Franklin Robinson ✠ Kansas City, Mo.; University of Pennsylvania Department of Medicine, Philadelphia, 1896; an Affiliate Fellow of the American Medical Association; fellow of the American College of Surgeons; medical director of the Business Men's Assurance Company; on the staffs of the Research and St. Luke's hospitals; died February 5, aged 73, of coronary thrombosis.

Albert Walton Roth ✠ Tulsa, Okla.; the Hahnemann Medical College and Hospital, Chicago, 1900; honorary member and in 1917 president of the Tulsa County Medical Society; founder and president of the Tulsa Public Health Association; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; on the staff of the Hillcrest Memorial Hospital; died March 17, aged 71, of pulmonary edema and heart block.

Joseph Roth, Passaic, N. J.; New York Homeopathic Medical College and Hospital, New York, 1906; died in the Beth Israel Hospital March 20, aged 60, of postencephalitis.

Fritz Rubinstein, Woodhaven, N. Y.; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, Germany, 1923; served a residency at St. Joseph's Hospital for Consumptives in New York and the Rocky Glen Sanatorium in McConnelsville, Ohio; resident on the staff of St. Anthony's Hospital; died in New York December 6, aged 47.

Joseph Cheesman Thompson ✠ Medical Inspector, Commander, U. S. Navy, retired, San Francisco; Columbia University College of Physicians and Surgeons, New York, 1896; entered the U. S. Navy on Nov. 26, 1897; retired Nov. 15, 1929 on his own application after thirty years' service; died March 7, 1943, aged 68, of heart disease.

Stephen Tarnoczi Turney ✠ Barberton, Ohio; Ohio State University College of Medicine, Columbus, 1931; interned at the Charity Hospital in New Orleans; on the staff of the Citizens Hospital; died in the Cleveland Clinic Hospital, Cleveland, February 13, aged 43, of respiratory failure following laminectomy.

Francis Raymond Ward, New York; University of the City of New York Medical Department, New York, 1890; died December 18, aged 77.

Henry C. Werner ✠ Fond du Lac, Wis.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1905; member of the American Psychiatric Association; superintendent of the Wisconsin Memorial Hospital in Mendota from 1927 to 1933 and the Southern Wisconsin Colony and Training School in Union Grove from 1917 to 1923; died February 6, aged 70, of carcinoma of the prostate.

William Francis Willoughby, Englewood, N. J.; New York Homeopathic Medical College and Flower Hospital, New York, 1913; assistant medical examiner for Bergen County; served as a member of the Englewood Board of Health for many years; a member of the medical staff of the Englewood Hospital; died February 28, aged 60, of cerebral hemorrhage and hypertension.

Charles M. Wood ✠ Maroa, Ill.; Northwestern University Medical School, Chicago, 1894; served on the staffs of the Decatur and Macon County Hospital and St. Mary's Hospital in Decatur; died in the West Suburban Hospital, Oak Park, February 25, aged 73, of diabetes mellitus.

PUBLIC HEALTH SERVICE

Orestus D. Adamson, Sabine, Texas; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1912; acting assistant surgeon in the U. S. Public Health Service; medical officer in charge of U. S. Quarantine Station at the time of his death; died in the U. S. Marine Hospital, Galveston, February 13, aged 66, of heart disease.

Correspondence

BLOOD AND SPINAL FLUID TESTS FOR SYPHILIS IN MALARIAL PATIENTS

To the Editor:—The article "Blood and Spinal Fluid Tests for Syphilis in Malarial Patients," by Harold W. Potter, Lewin H. Bronstein and Charles M. Gruber (THE JOURNAL, March 24, p. 699) is excellent evidence for the occurrence of nonspecific syphilis reactions in "natural" malaria. To make these observations completely useful, it is necessary to look at them from the opposite side too and establish the conditions under which a positive serologic reaction may be accepted with no more criticism than is always required in evaluating serotests for syphilis. The authors have not overlooked this, but more emphasis is advisable if we don't want to err by leaning back too far.

The clearcut experiences on inoculated malaria, although not applicable without discernment, should facilitate orientation in the more intricate maze of natural malaria. The regular occurrence of positive syphilis reactions in nonsyphilitic persons inoculated with malaria was first described by Ludwig Horn (*Jahrb. f. Psychiat. u. Neurol.* **43**:247, 1924). His results were confirmed by subsequent investigators. The facts (also derived from unpublished observations) were that every case becomes distinctly seropositive after the sixth fever bout; every case becomes seronegative again within eight weeks after termination of malaria; the most sensitive test (at that time the Wassermann reaction with R. Mueller's antigen) becomes positive sooner and stays so longer than the less sensitive ones (at that time Meinicke's earlier methods and the Sachs-Georgi reaction).

Although these observations were made only on inoculation with a strain of Plasmodium vivax acclimatized to transmission from man to man, there is no reason to assume a smaller percentage of positive reactions during a limited period of natural malaria. As for the return to negativity, such a straight conclusion is not permitted, because of circumstances that are too complicated to be discussed here. An indirect approach can be gained by performing the Henry test (*Arch. Inst. prophylac.* **1**:341, 1929) in inoculation malaria (Brandt, Robert, and Horn, Ludwig: *Klin. Wchnschr.* **14**:1538 [Oct. 26] 1935). The curve of reactions, from negative to positive to negative, closely resembles the curve of the nonspecific reactions for syphilis. As Henry describes the behavior of his test in malaria disease just the way we found it in malaria inoculation, we may expect the same parallelism also in the nonspecific syphilis reactions, meaning that, a certain time after cessation of fever attacks, malaria does not produce such reactions (except, of course, in an indirect manner e. g. by having caused liver damage that outlasts the actual infection). A negative Henry test, therefore, by indicating that the period of manifest malaria infection has passed, would enhance the dependability of a positive syphilis reaction, where malaria has to be taken into account.

We can also supply a direct contribution. After the last war the number of patients with a history of malaria was considerable among former Austrian soldiers. Since at that time the introduction of routine serologic examination on the one hand and the progressively increased sensitivity of the tests (in our case the Mueller conglobation reaction) on the other hand furnished a great number of unexpected positive reactions, the question of specificity was foremost in our minds. We explored every such case for nonspecificity, applying all the required criteria. These extensive investigations did not present the slightest indication that, beyond the stage of attacks, malaria has any influence on the outcome of serologic syphilis reaction.

Altogether, the average percentage of positive reactions in nonsyphilitic persons does not give the full picture. During the manifest disease we must expect a much higher incidence, but afterward the percentage soon reaches zero.

ROBERT BRANDT, M.D., Cincinnati.

USE OF MAGNET FOR REMOVAL OF FOREIGN BODIES

To the Editor:—In the January 13 issue of THE JOURNAL, under Clinical Notes, Dr. Murdock Equen reports "A New Magnet for Foreign Bodies in the Food and Air Passages." The widespread newspaper, trade journal and magazine coverage of the original use by us of the Alnico magnet for this purpose in June 1943 was perhaps considered too well known to require quoting as the source of the method employed by Dr. Equen.

However, there are medical references of which Dr. Equen was apparently unaware when he requested a duplicate of the magnet we employed from General Electric. Our case was reported at a meeting of the Section on Otology, Rhinology and Laryngology of the Medical Society of the County of Kings and Academy of Medicine of Brooklyn, Nov. 10, 1943. Dr. Moorehead and Dr. Clerf, who discussed our paper, predicted the future usefulness and easy general applicability of the method, which our continued use and Dr. Equen's communication some fifteen months later confirms.

The original article presenting the use of the Alnico magnet was published in the *Annals of Otology, Rhinology & Laryngology* (**53**:589 [Sept.] 1944) and was entitled "The Use of a Permanent (Alnico) Magnet in the Peroral Removal of a Metallic Foreign Body (Padlock) from the Stomach," by Samuel Silber, M.D., Carl Kaplan, M.D., and Bernard Epstein, M.D.

It should be further noted that the magnet was not new even when we used it. The only thing new about it was the search by one of us (S. S.) for such an instrument to serve the specific purpose of removing a swallowed magnetic foreign body. This search led to an industrial plant, which like many others, began using the Alnico magnet in a wide variety of machines soon after it was first introduced by the General Electric Company in 1935.

We believe that the interests of historical accuracy and your high standards will be served by this addendum.

SAMUEL SILBER, M.D.
CARL KAPLAN, M.D.
BERNARD S. EPSTEIN, M.D.
Brooklyn.

MEDICAL COLLEGE OF SOUTH CAROLINA

To the Editor:—In THE JOURNAL for March 31, page 867, there is a statement relative to affairs in South Carolina which misrepresents the situation rather seriously and I beg you to publish this correction.

The commissioners of the Roper Hospital have not opposed the expansion program of the medical college except as far as the building of a large hospital is concerned, feeling that the addition to the Roper Hospital now under construction would furnish the facilities needed for larger classes. The commissioners were authorized by the medical society to give full publicity to their proposal and they thought they were carrying out the expressed wishes of the society in acting as they did. The society had at no time approved the program in toto but only in principle, and the commissioners expressed definitely their approval of expanding the teaching facilities of the college and their willingness to cooperate.

A few days after passing the condemnatory resolution, the society passed another resolution expressing confidence in the board of commissioners. I am asking you to publish this letter in justice to the commissioners, whose attitude and whose actions have been misrepresented.

ROBERT WILSON, M.D., Charleston, S. C.
Dean Emeritus, Medical College of the State of South Carolina.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Venereal Disease: Breaking of Quarantine as a Punishable Offense.—The relator, because of being infected with venereal disease, was committed to "communicable disease isolation quarters." She escaped from those quarters, was subsequently apprehended and fined $25 for breaking quarantine and was committed to jail until payment of the fine. She filed a petition for habeas corpus on the ground that no law in Tennessee, the state in which she was committed, provides for fine and imprisonment as a penalty for leaving or escaping from quarantine. The trial judge ordered her discharge from jail but remanded her to the communicable disease isolation quarters from which she had escaped. The sheriff, the custodian of the jail, appealed to the Supreme Court of Tennessee.

The sole question to be determined here, said the supreme court, is whether or not the statutes of Tennessee provide for punishment by fine of one who leaves quarantine without permission of the health officer in charge. Chapter I of title 13, Code of Tennessee, 1932, deals comprehensively with the general subject of "Preventing the Spread of Disease," and article VII specifically deals with syphilis and other venereal diseases, which are defined in the code, section 5813, as amended, and declared to be "communicable, and dangerous to the public health." By section 5816, as amended, health officers are empowered to "make examinations of persons reasonably suspected . . ." of "being infected with a venereal disease of a communicable nature" and, "when in the judgment of the state, municipal or county health officer, it is necessary to protect the public health, to isolate and quarantine persons infected with a venereal disease." The relator having been found to be so infected and thereon placed in quarantine, it cannot be questioned, in view of the code provisions just referred to, that her isolation and quarantine confinement by the health officers was lawful. It is the general rule, continued the court, that one who breaks a lawful quarantine is subject to punishment for so doing. See 12 R. C. L. 1292 and cases cited in notes. Furthermore, the code, section 5818, as amended, provides that "No one but a state, municipal, district or county health officer or his duly authorized representative shall establish and terminate isolation or quarantine of persons infected with venereal diseases." Also that "the release of a person from isolation or quarantine shall be made when in the judgment of the health officer the disease is no longer communicable."

The sheriff relied on the provisions cited for enforced segregation and quarantine of those found to be afflicted with such contagious diseases and for the termination of such isolation or quarantine only by a health officer and as justifying the imposition of the fine on the relator, invoked section 5824, *ibid.*, which provides that:

> Any health officer or *any other person* who fails to perform the duties required of him in this statute, or violates any of the provisions of same, or of any rule or by-law promulgated under its authority, shall be guilty of a misdemeanor, and be fined not less than twenty-five dollars and not more than five hundred dollars, and each violation shall be a separate offense.

No stretch of construction, said the Supreme Court, is required to bring relator within the descriptive phrase "any other person," as italicized. It seems reasonably clear that one who has been placed in quarantine "fails to perform the duties required of him" and violates a basic purpose of the statute, when he leaves quarantine against the orders of those in charge and thereby subjects himself to the penalty provided by this code section. The whole scheme of segregation and isolation by quarantine would be ineffectual and frustrated unless an obligation is imposed on those found necessary to place in quarantine to observe its isolation restrictions. Moreover, supporting this view, by code, section 5822, it is provided that "The state department of health is empowered and directed to make such rules and by-laws for the . . . isolating and quarantining of infected persons as it may, from time to time, deem advisable." A copy of "regulations" issued by the department is brought up with the record on the appeal and "regulation 13" therein provides that:

> (A) Every person who is infected with a communicable disease, who is a carrier of the infection of a communicable disease, who is suspected of having a communicable disease or who is a contact with a case of communicable disease shall strictly observe and comply with all orders, isolation and quarantine regulations and restrictions given or imposed by the local health officer or the State Department of Public Health, in conformity with law and pursuant to these regulations.

One who fails and refuses to "observe and comply with" such isolation and quarantine regulations violates a duty imposed on him by law and is not only subject to the penalty provided by the foregoing section 5824 but is guilty under code section 11054, declaring it a misdemeanor for one confined in a workhouse or jail on any charge of a criminal offense *"or otherwise lawfully so confined"* to escape or attempt to escape therefrom. The language italicized would seem to include one lawfully confined in quarantine. And, finally, under article V of this same chapter, subhead "Prevention of Communicable Diseases," appears code section 5793, which expressly provides for fine and imprisonment of "any person isolated or quarantined who shall wilfully escape . . . before he has fully recovered," and so on, which would seem to have application. It is true that venereal diseases were excepted from communicable diseases dealt with under this article, code section 5789, but, as has been seen, by subsequent enactment (code section 5813) venereal diseases are expressly declared to be communicable diseases subject to quarantine, so that, in application of the pari materia rule, this provision for punishment may well be extended to those quarantined for such diseases who escape before recovery. But, however this may be, on the grounds hereinbefore set forth, we hold that the relator was lawfully in isolation and confinement and was subject to fine for having escaped therefrom. Her detention was therefore not illegal and the judgment below must be reversed. Accordingly, apparently, the prisoner was remanded to the custody of the sheriff. —*State ex rel. Kennedy v. Head, Sheriff, 185 S. W. (2d) 530 (Tenn., 1945).*

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

BOARDS OF MEDICAL EXAMINERS
BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of the boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, May 5, page 53.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II, July 16-18. Part III. Various centers, June. Exec. Sec., Mr. E. S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF INTERNAL MEDICINE: *Oral.* New Orleans, May 21-23, Philadelphia, June 6-8 and Chicago, June 27-29. San Francisco, Oct. 15-17. *Written.* Various centers, Oct. 15. Final date for filing application is Aug. 1. Candidates in the armed forces may take the examination at their station with the permission of their medical commanding officer. Asst. Sec., Dr. W. A. Werrell, 1301 University Ave., Madison 5, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: Chicago, May 28. Sec., Dr. Paul Bucy, 912 S. Wood St., Chicago 12.

AMERICAN BOARD OF OBSTETRICS & GYNECOLOGY: *Part II. Oral.* Atlantic City, June 13-19. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh 6.

AMERICAN BOARD OF OPHTHALMOLOGY: New York, June 13-16; Chicago, Oct. 4-6; and Los Angeles, January. Sec., Dr. S. Judd Beach, 56 Ivie Rd., Cape Cottage, Me.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Part I. Oral and Written.* New Orleans, Sept. 28-29, Philadelphia, Oct. 5-6, Chicago, Oct. 12-13 and San Francisco, Oct. 19-20. Final date for filing application is August 1. Sec., Dr. G. A. Caldwell, 3503 Prytania St., New Orleans 15.

AMERICAN BOARD OF OTOLARYNGOLOGY: Chicago, Oct. 3-6. Sec., Dr. Dean M. Lierle, University Hospital, Iowa City, Ia.

AMERICAN BOARD OF PATHOLOGY: Philadelphia, June 13-14. Final date for filing application is May 15. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit 2.

AMERICAN BOARD OF SURGERY: *Written.* Various centers, October. Final date for filing application is Aug. 1. Sec., J. S. Rodman, 225 S. 15th St., Philadelphia 2.

AMERICAN BOARD OF UROLOGY: *Written.* Chicago, Dec. 9. *Oral.* Chicago, Feb. 19-22. Sec., Dr. Gilbert J. Thomas, 1409 Willow St., Minneapolis 4.

Current Medical Literature

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Common Knee Injuries: Some Aspects in Diagnosis and Treatment. W. A. Dalmain.—p. 503.
Collapse of Glass Eyes in Orbit: Case Report. W. M. Hayes.—p. 510.
Dislocations of Shoulder. L. F. Bush.—p. 520.
*Local Treatment of Burns with Pressure Dressings and Films Containing Sulfonamide. E. C. Reese.—p. 524.

Pressure Dressings and Films Containing Sulfonamides in Burns.—Reese reports results obtained in 43 cases of burns treated with films containing sulfonamides held in place by pressure dressings. The film used was 0.004 inch thick, transparent and pliable, and it conformed easily to body surfaces. The base of the film was methylcellulose, to which was added triethanolamine in addition to a plasticizer. The standard film employed contained 20 per cent sulfanilamide and 10 per cent sulfacetimide. It was estimated that 1 sq. cm. of the film contains 3 mg. of the sulfonamide. Recently 0.5 per cent proflavine has been added to the film. Triethanolamine was used in this film because it maintains the hydrogen ion concentration of the surrounding medium at a slightly alkaline reaction (p_H 8.5), which enhances the effectiveness of sulfanilamide. Utmost aseptic precautions were taken. In 39 cases the burns were second degree; in 4 cases second and third degree burns were present. Reese found that the healing time with this treatment compares favorably with most of the accepted methods of therapy. The film appears to possess an important advantage in that it forms a protective transparent coating which is not removed until full healing has occurred. Painful redressings are thus eliminated, and injury to partially devitalized structures and fragile newly growing epithelium is prevented.

American Journal of Tropical Medicine, Baltimore

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Blood Transfusion in Treatment of Internal Disease. A. A. Bogomolets.—p. 196.
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*Frozen Plasma: New Blood Substitute. V. I. Kasanski.—p. 207.
Preservation of Erythrocytes and Their Clinical Use. V. I. Kasanski.—p. 210.
Effect of Prolonged Pressure on Peripheral Abdominal Nerves. A. I. Browde.—p. 213.
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Physiotherapy of Wounds. I. A. Piontocovsky.—p. 221.
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Control of Chronic Dysentery. E. D. Ravitch-Birger and E. M. Ravikovitch.—p. 256.
Intravenous Alcohol Anesthesia. E. V. Verkhovskaya.—p. 260.

Frozen Plasma.—Fresh blood plasma, prepared according to the directions of the Central Institute for Blood Transfusions in ampules or bottles, is placed in a freezing chamber at temperatures of from —15 to —25 C. Before transfusion plasma is thawed by placing the unopened containers into a water bath at a constant temperature of 38 to 40 C. The time required for thawing and warming averages twenty minutes. Only in rare cases does residual flocculation necessitate filtration of plasma. Determinations of viscosity, turbidity, protein fraction and refractive index were carried out before freezing and after thawing. These investigations established the absence of irreversible physicochemical changes of the proteins. The use of

frozen plasma does not cause toxic effects. The therapeutic effect of transfused thawed blood plasma is the same as with fresh plasma. Thawed plasma may be used for the same diseases and in the same doses as fresh blood. Like fresh plasma, it is the best blood substitute.

Stimulation of Wound Healing by Embryonal Tissue.—Goldberg prepared embryonal extracts in a castor oil emulsion or petrolatum ointment. Since war wounds are contaminated, 0.3 or 0.5 per cent of xeroform or 0.5 to 1 per cent of sulfanilamide was added. Ointments with a petrolatum base containing embryonal tissue were used in the clinics and hospitals of the Siberian military medical units beginning with July 1942. Petrolatum ointments are more convenient in the treatment of superficial wounds and of ulcers, since they remain in contact longer with the wound surface. The emulsion in castor oil produced sensations of burning and irritation of the surrounding skin. The same emulsion in petrolatum facilitated the filling of osseous defects after sequestrotomy. The 15 per cent ointment proved more effective than the 5 per cent emulsion previously used and replaced the emulsion in evacuation hospitals and clinics in wounds of soft tissues with or without periostitis and fracture, in sluggish wounds in denervated tissue, in chronic wounds in stumps with or without osteomyelitis, in sluggish ulcers from varicosities, burns and frostbite, and for filling osseous defects after sequestrotomy. Embryonal emulsion in ointment form stimulated the growth of epithelium and fibroblasts. Wound exudates diminished after treatment with 15 and 25 per cent ointments. Granulation tissue appeared earlier and grew more intensively than in control cases. Epithelization was rapid, with penetration of epithelial strands into the granulation tissue. Cornification of epithelium was hastened.

Bulletin of Los Angeles Neurological Society

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Neonatal Asphyxia: Its Encephalic Residuals and Mechanism of Their Production. C. B. Courville and C. Marsh.—p. 121.
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Connecticut State Medical Journal, Hartford

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Connecticut Plan for Chronically Ill. K. F. Heiser.—p. 199.

Delaware State Medical Journal, Wilmington

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Early Diagnosis and Management of Gynecologic Cancer. C. T. Beecham.—p. 19.
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Georgia Medical Association Journal, Atlanta

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Journal of Immunology, Baltimore

50:61-126 (Feb.) 1945

Comparative Study of Complement: I. Specific Inactivation of Components. J. E. Cushing.—p. 61.
Id.: II. Interaction of Components of Different Species. J. E. Cushing.—p. 75.
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Journal of Lab. and Clinical Medicine, St. Louis

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*Isoimmunity to Rh Factor as Cause of Blood Transfusion Reactions. E. L. De Gowin.—p. 99.
Studies of Sickle Cell Formation in Normal Saline, Plasma and Sera with Carbonic Anhydrase Inhibitors. W. J. Tomlinson and J. E. Jacob.—p. 107.
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Alkaline Medium and Procedure for Selection of Dermatophytes in Presence of Saprophytic Fungi. J. M. Leise and L. H. James.—p. 119.
Therapeutic Effectiveness of Penicillin in Treatment of Vincent's Stomatitis and Its Failure to Influence Favorably Certain Other Medical Conditions. J. S. Sweeney, W. J. Morginson, R. W. Robinson and E. M. Kilpatrick.—p. 132.
Evaluation of Technics Used in Diagnosis of Enterozoic Parasitism in Children. R. L. Brown.—p. 135.
Low Toxicity in Animals of Boric Acid as Preservative Agent. D. V. Frost and R. K. Richards.—p. 138.
Relationships of Chemical Constitution to Antibacterial Effects of Derivatives of 9-Aminoacridine. G. R. Goetchius and C. A. Lawrence.—p. 145.

Isoimmunity to Rh Factor and Transfusion Reactions.—In order to obtain some perspective on the incidence of isoimmunity to the Rh factor in a general transfusion service De Gowin studied 5,386 consecutive blood transfusions at the University of Iowa Hospitals. Multiple transfusions were given to recipients without regard to Rh type or to obstetric history of female recipents. Transfusion reactions of all types were studied for evidence of isoimmunization with the Rh factor. In 3,132 transfusions given to 1,112 males, the incidence of reactions was 3.1 ± 0.2 per cent. In 1,004 female recipients of all ages the incidence of reactions was 3.9 ± 0.4 per cent in 2,254 transfusions. This is considered to be a statistically significant difference in the sexes which may possibly be explained by isoimmunity to the Rh factor developed during pregnancy. In the 186 transfusion reactions of all types, only 6 could be attributed to isoimmunity to the Rh factor. Isoimmunity was attributed to multiple transfusions in 4 instances and to pregnancy in 2. There was a fatality from transfusion of Rh positive blood into a recipient who had been sensitized by multiple transfusions. It is estimated that of the 399 recipients receiving four or more transfusions approximately 60 were Rh negative. Only 4 of these were immunized to the Rh factor by multiple blood transfusions. The case histories of the 6 recipients with isoimmune reactions are reported. Preliminary cross matching for the anti-Rh agglutinin would not have prevented all of the reactions. The author shows that there are many difficulties in testing for Rh incompatibilities, such as lack of sources of Rh typing serums and of adequate methods of demonstrating anti-Rh antibodies in the laboratory. It is frequently necessary to work with weak anti-Rh agglutinins in cross matching blood. The time required for incubation of cell-serum suspensions for the

demonstration of the anti-Rh agglutinin (from thirty to sixty minutes) imposes a serious delay if the transfusion is an emergency treatment, and, since the delay is considered more dangerous than the possibility of a reaction from Rh incompatible blood, the Blood Transfusion Service has decided to forego the incubation of cell suspensions preliminary to urgent transfusions.

Michigan State Medical Society Journal, Lansing

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Preanesthetic Preparation of Surgical Patient. E. A. Rovenstine.—p. 45.
Clinical Manifestations of Sulfonamide Toxicity and Hypersensitivity. R. H. Lyons.—p. 51.
Advance in Prevention and Treatment of Poliomyelitis. J. L. Wilson. —p. 59.

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Tubovalvular Gastrostomy: History and Technic (Determining Credit for Origination in Surgery). M. Thorek.—p. 153.
Observations on Tropical Medicine in United States Army. C. C. Hillman.—p. 165.

New England Journal of Medicine, Boston

232:149-180 (Feb. 8) 1945

*Diagnosis of Posterior Herniation of Lumbar Intervertebral Disks. D. Munro.—p. 149.
Convulsions During General Anesthesia. E. E. Simpson.—p. 160.
Giant Calculus of Appendix: Report of Case. L. S. Pilcher.—p. 163.
Abdominal Surgery. A. W. Allen.—p. 165.

Posterior Herniation of Lumbar Intervertebral Disks.—Munro believes that a clinical diagnosis of a posterior herniation of the nucleus pulposus of a ruptured lumbar intervertebral disk which is based only on the history and physical and neurologic examinations, if unconfirmed by other objective findings, is at best only a "possible" diagnosis. Surgery is not justified under such circumstances. If one can demonstrate a sensory deficit that corresponds to the peripheral distribution of a low lumbar or upper sacral root, together with atrophy and loss of ankle jerk in the same leg, a diagnosis of irritation or compression of this particular root is justified. If in addition there is a history of intermittent attacks of pain in the back with radiation to any part of the leg, especially to the lower part of the leg, which is associated with initiation or increase of the typical pain by coughing, sneezing or straining or by back motion or lifting, and if these attacks started after a back injury, back strain, lifting strain or fall, a posterior herniation of either the fourth lumbar or lumbosacral disk must be seriously considered as a cause of the radiculitis. This cannot be regarded as a certainty, however, unless confirmed by other and more accurate data. A positive straight leg raising or Lasègue test, limitation or loss of back motion, a change in the lumbar curve, spasm of the erector spinae muscles and local tenderness in the lumbosacral area indicate only that the patient has some trouble with the lower part of his back, lumbosacral roots or cauda equina and neither confirm nor deny the diagnosis of a herniation. A history and examination such as given, if accompanied by a partial or complete dynamic block or an increase in the total protein of a sample of cerebrospinal fluid properly collected from below the level of the block, or both of these, justify a diagnosis of irritation or compression of any part or all the cauda equina and a probable diagnosis of either an intraspinal tumor or a midline posterior herniation of a lumbar disk. Final differentiation must at least await myelography and in many cases operation. The level of herniation is usually not determinable on the basis of pure clinical data. Multiple herniations cannot be diagnosed without adequate preoperative visualization of the lower subarachnoid space. Certain diagnosis, both concerning the presence of a herniation or herniations and concerning the level, depends on adequate visualization of the lumbosacral subarachnoid space by some opaque contrast medium. Skiodan in 20 per cent solution has proved satisfactory for this purpose.

New Jersey Medical Society Journal, Trenton

42:37-74 (Feb.) 1945

Purpura Annularis Telangiectodes (with Report of Early Case). E. M. Satulsky.—p. 42.
Penicillin Sodium in Treatment of Sulfonamide Resistant Gonorrhea. J. F. Judge.—p. 45.
Brief Psychotherapy: Report of Case. E. F. Baker.—p. 46.

Oklahoma State Medical Assn. Jour., Oklahoma City

38:1-42 (Jan.) 1945

The "Reformed Gallbladder." G. H. Miller.—p. 1.
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Puerto Rico J. Pub. Health & Trop. Med., San Juan

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Skin and Precipitin Reactions to Antigens from Cercariae and Adults of Schistosoma Mansoni. J. O. González and Caroline K. Pratt. —p. 242.
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Surgery, St. Louis

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Certain Sulfonamide Drugs and Certain Derivatives of Ascorbic Acid in Experimental Gas Gangrene in Wounded Mice. F. J. Ryan, R. Ballentine, Lillian K. Schneider and Gwendolynn M. Tuck.—p. 47.
Efficacy of Heparin Administered by Intravenous, Intramuscular and Subcutaneous Routes and Study of Effect of Five Bacteriostatic Agents on Heparin Action. J. Walker.—p. 54.
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Surgical and Anatomic Significance of Mamillary Tubercle of Last Thoracic Vertebra. E. B. Kaplan.—p. 78.
Traumatic Osteochondritis of Patella. F. J. Cox.—p. 93.
Treatment of Tendons in Finger Amputations and Description of New Instrument. G. V. Webster.—p. 102.
Modified Calibrated Skin-Grafting Knife: Further Observations. K. M. Marcks.—p. 109.
Anesthesia for Burned Patient. E. M. Papper.—p. 116.
Orthopedic Surgery for Reconstruction of Congenital Malformations of Kidney. R. Gutierrez.—p. 122.
Extensive Varicosities of Leg Originating from Gluteal Vein: Report of Case. W. H. Prioleau.—p. 135.
New Hemostatic Clamp: Description of Hemostat Carrying Multiple Preformed Ligatures. G. Cubero.—p. 138.

Local Application of Sulfathiazole in Incisions.—Seventy incisions for lobectomies and pneumonectomies were studied. The incisions passed through the skin and subcutaneous tissue, posteriorly through the trapezius and rhomboid muscles and anteriorly through the latissimus dorsi and serratus anterior. The control or prior groups consisted of 35 patients. The experimental group consisted of the 35 patients operated on in the period immediately following that in which the control group of patients came to operation. In this experimental group not more than 2 Gm. of sterilized sulfathiazole powder was rubbed into every nook and cranny of the extensive incisions before opening into the pleural cavity, thus producing a film of serum and blood saturated with sulfathiazole overlying all of the exposed tissue. Thirteen wound infections occurred in the control group, while only 4 occurred in the experimental group. Sulfathiazole applied locally in the experimental series was the only important factor to which the reduced incidence of wound infection in the experimental group could be attributed.

Wisconsin Medical Journal, Madison

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Treatment of Involutional Psychosis in the Male. E. Haynes and J. S. L. Jacobs.—p. 209.
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FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Heart Journal, London

6:167-254 (Oct.) 1944

Congenital Pericardial Defects. S. Sunderland and R. J. Wright-Smith. p. 167.
*Casual and Basal Blood Pressures: IV. Their Relationship to Supplemental Pressure, with Note on Statistical Implications. F. H. Smirk. —p. 176.
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*Mercurial Diuretics: Addition of Magnesium Sulfate to Prevent Toxic Effects of Their Intravenous Administration. I. Pines, A. Sanabria and R. T. Hernandez Arriens.—p. 197.
Clinical Evaluation of Pressor Activity of Methedrine, Neosynephrine, Paredrine and Pholedrine. F. Prescott.—p. 214.
Unity of Paroxysmal Tachycardia and Auricular Flutter. W. Evans. —p. 221.
Chest Leads for Demonstration of Auricular Activity. P. Szekely. —p. 238.

Casual and Basal Blood Pressures.—Smirk defines casual blood pressure as the sum of the basal blood pressure and the supplemental pressure: this last represents the degree of blood pressure elevation above the basal level due to whatever degree of physical, emotional and suprabasal metabolic activity is present at the time of blood pressure measurement. The basal pressure is the pressure measured at a time when physical, emotional and metabolic activity are reduced to a physiologic minimum. Failure to obtain the true basal reading will not always be apparent to the observer, especially when the failure is due to emotional reasons. Both normal and hypertensive subjects with a high basal pressure have a greater statistical expectation of having a high casual pressure than do those whose basal pressure is low. Likewise those with high supplemental pressures have a greater statistical expectation of a high casual pressure than do those whose supplemental pressure is low. In comparing one individual with another the basal and supplemental pressures, on the other hand, are independent variables in the sense that the level of the basal blood pressure in an individual is no guide to the probable level of the supplemental pressure. Most statistics concerning the level of the blood pressure are concerned with the casual readings. The fact that, when comparing 1 individual with another, within a comparable physiologic group, the casual blood pressure is to be regarded as the sum of two independent variables has statistical implications. The supplemental pressure forms a significantly higher proportion of the casual pressure among patients with essential hypertension than among normal subjects. An improved method is recommended for determining the basal blood pressure.

Magnesium Sulfate to Prevent Toxic Effects of Mercurial Diuretics.—Pines and his associates state that an analysis of toxic symptoms and signs which appear after mercurial diuretics proves that some of them depend on the drug itself and not on the diuresis. The mercuric ion liberated from organic mercurials produces abundant diuresis through its action on the renal tubules, but simultaneously in certain doses, and if appearing rapidly in the blood stream of a mammal, it provokes serious disturbances in the conduction system of the heart as well as in the musculature of the ventricles. The authors studied the course of acute intoxication produced by the intravenous or intracardiac injections of esidrone on normal dogs with the help of the electrocardiograph. They concluded from these studies that mercurial diuretics in certain doses are general depressants for the whole cardiac muscle. The following pattern of intoxication was observed: changes of T waves, intraventricular and auriculoventricular conduction disturbances, diminution of frequency of impulse formation in the sinoauricular node, ventricular paroxysmal tachycardia, chaotic heart action, ventricular fibrillation and death. The addition of small quantities of magnesium sulfate (0.5 cc. of a 20 per cent solution) prevents ventricular fibrillation and death even if doses seven times higher than normal lethal doses are used. Magnesium sulfate does not prevent and perhaps even increases the conduction disturbances resulting from the administration of lethal doses of mercurial diuretics. On the other hand, such amounts of magnesium sulfate increase the diuretic response, are entirely safe and mix with mercurial diuretics without forming any precipitate. It is suggested that small quantities of magnesium sulfate be incorporated into the mercurial diuretics in order to prevent fatal reactions sometimes resulting from the intravenous injections of these drugs.

British Medical Journal, London

3:141-174 (Feb. 3) 1945

Clinical Characters of Pain. W. Ganado.—p. 141.
Some Social Aspects of Burns in Glasgow. A. Brown, E. Lewis-Faning and M. M. Whittet.—p. 144.
Chronic Intracerebral Hematomata: Their Pathology, Diagnosis and Treatment. G. F. Rowbotham and A. G. Ogilvie.—p. 146.
*Sulfanilylbenzamide, Sulfanilylamidobenzamide and Succinylsulfathiazole in Chemotherapy of Sonne Dysentery. R. Swyer and R. K. W. Yang. —p. 149.
Hemolytic Disease of Newborn in One of Dizygotic Twins. F. Stratton, F. A. Langley and U. Lister.—p. 151.
Elimination of Cross Infection: An Experiment. H. P. Pickerill and Cecily M. Pickerill.—p. 159.

Chemotherapy of Sonne Dysentery.—Swyer and Yang say that of 179 patients with bacteriologically proved Sonne dysentery 41 were treated with sulfanilylbenzamide, 112 with sulfanilylamidobenzamide and 26 with succinylsulfathiazole. The stools became formed, normal in color and free from blood or mucus in twenty-four to forty-eight hours in the sulfanilylbenzamide series, and in 38 of these cases bacteriologic clearance was obtained in an average of 1.8 days. Improvement in characteristics of stools was well defined with sulfanilylamidobenzamide but rather less so than with sulfanilylbenzamide. The average time for clearance was 3.6 and 2.5 days with full and half dosage respectively. With succinylsulfathiazole there was not a great improvement in stools, but clearance time was 2.4 days. Bacteriologic relapse rates were 7.3 per cent with sulfanilylbenzamide, 15 per cent with a full dose of sulfanilylamidobenzamide and 3.3 per cent with a half dose and 34.6 per cent with succinylsulfathiazole.

Deutsche medizinische Wochenschrift, Leipzig

69:679-712 (Oct. 1) 1943

Observations on Meningitis and on Encephalitis at the Battle Front. H. Assmann.—p. 679.
Differential Diagnosis of Tularemia from Tuberculosis. H. Schulten. —p. 683.
Treatment of War Nephritis. Hantschmann.—p. 685.
Clinical Picture of Epidemic Hepatitis. M. Bürger.—p. 687.
*Deliberate Puncture of Liver. H. Kalk, W. Brühl and W. Sieke. —p. 693.
Participation of Secretion of Renal Tubules in Production of Urine. G. Kuschinsky and H. Langecker.—p. 695.
Prognosis of Nephritis. H. Sarre.—p. 698.
Fatal Ascending Paralysis After Diphtheria. R. Bauer and F. Schennetten.—p. 702.

Deliberate Liver Puncture.—Deliberate liver puncture is the term coined by Kalk and his associates to designate a method in which the macroscopic examination of the liver by laparoscopy was combined with liver puncture for the purpose of microscopic examination. Puncture was performed under local anesthesia by means of a cannula of Roholm and Iversen's type after the introduction of the laparoscope into the air filled abdomen. This cannula is 2 mm. thick and has four fine teeth at its end, which may produce a sawlike effect on rotation. The cannula is graduated at a distance of from 3 or 4 cm. from its end so that it may not be inserted too far into the liver. In cases of diffuse changes of the liver, i. e. in parenchymatous icterus or in icterus due to obstruction, the puncture was carried out at a distance of from 5 to 7 cm. from the anterior border of the liver. The danger of hemorrhage may be prevented by this method, which has been used 123 times within two years. One additional advantage for this method is the fact that puncture of the left lobe of the liver may be carried out successfully. There were no untoward reactions and the patient was free from pain during the entire procedure. The cirrhotic origin of a primary cancer of the liver was demonstrated on microscopic examination in 2 cases and the diagnosis of sarcoma was clarified in a doubtful case of tumor.

Book Notices

The Diagnosis and Treatment of Acute Medical Disorders. By Francis D. Murphy, M.D., F.A.C.P., Professor and Head of the Department of Medicine, Marquette University School of Medicine, Milwaukee. Cloth. Price, $6. Pp. 503, with illustrations. Philadelphia: F. A. Davis Company, 1944.

The author has written a small but valuable book intended primarily for the general practitioner and medical student. Drawing from his more than twenty years' experience as clinical director of the Milwaukee County Hospital he has observed that, while chronic disorders are managed satisfactorily, difficulties are encountered in the treatment of the acute diseases. The subject matter is well organized and written in a style that is read with ease. The book begins with a comprehensive discussion of the acute vascular episodes, including the management of cerebral vascular crises and acute vascular occlusions. This is followed by chapters on diseases of the blood and heart, metabolic disorders, diseases of the nervous system, kidneys, lungs and acute abdominal emergencies. Chapters on the acute infections, tropical diseases and acute poisonings are presented in outline form. A final short chapter on drugs summarizes the pharmacology of digitalis and the sulfonamides. Lengthy discussions of etiology and pathology have been avoided to a great extent, while more emphasis has been placed on diagnosis and therapy. Since the form of management is based primarily on the medical experience of the author, and because of the size of the book, a bibliography is not included. Certain phases of therapy are questionable, such as endocrine therapy for cerebral vascular crises and the use of leeches in thrombophlebitis. The reviewer does not believe that hemophilia and Gaucher's disease are acute disorders.

Report upon the Work of the Miners' Phthisis Medical Bureau for the Three Years Ended 31st July, 1941. Published by Authority. Paper. Price, 8s. 6d. Pp. 46. Pretoria: Government Printer, 1944.

As heretofore, this publication contains a wealth of detail that can be appreciated only in the original. The exceptional opportunities of the bureau for continued observation of a large and relatively stable group of persons exposed to a dust of comparatively uniform composition provides one of the major sources of information on silicosis. It should always be remembered, however, that this disease varies in its local manifestations and that every detail of the conclusions is not necessarily applicable to other industries. The data demonstrate convincing evidence of the effect of a well regulated control program.

Before considering the results of the routine examinations, the report mentions several special investigations. In one based on 350 necropsies of persons previously given chest x-ray examinations it is concluded that, exclusive of chronic heart disease with pulmonary congestion, coarse miliary tuberculosis and perhaps siderosis from exposure to hematite dust, the x-ray pattern of "generalized mottling" is pathognomonic of silicosis. In persons with long industrial exposures in these mines the presence of "irregular opacities" in the apical regions with "well marked increase in linear striation" or "generalized arborization" are strongly suggestive of silicosis or tuberculosilicosis. A necropsy is reported on a hematite miner whose antemortem film had shown "generalized small mottling" but in which microscopic examination of lung sections revealed no evidence of nodular fibrosis. This is contrary to experience with hematite miners in the United States. It brings to mind the "pseudonodulation" of welders.

Previous summaries of the incidence of primary cancer of the lung in necropsies had indicated 1.27 per cent of 1,806 European males with no underground exposure, 0.74 per cent among 2,292 nonsilicotic European miners and 0.72 per cent among 1,948 silicotic miners. During the past eight years among 1,120 necropsies on deceased European miners there were 20 more cases of such tumor, 15 of them in silicotic miners and 5 in nonsilicotic ones. As the total number of men included in each category is omitted, no comparison of the current frequency is possible. However, it is concluded that "primary cancer of the lung is not more common in silicotic miners than in nonsilicotic miners."

Among 606 necropsies on native laborers examined because of pulmonary disease, 77 per cent had active tuberculosis with or without silicosis, all but 1.3 per cent being in relatively acute forms.

In the preemployment examinations of white miners, exclusion is rigorous and less than 40 per cent pass their initial tests. Sixty-eight per cent of those accepted were under 25 years of age and 87 per cent under 30. "Special certificates," certifying freedom from tuberculosis, are required for any person working underground for less than one hundred hours a month, a fact which indicates the rigorous exclusion of sources of occupational infection.

Periodic examination of all regular underground employees is made at six month intervals. Detection of tuberculosis at any periodic examination immediately debars a person from underground work. On discovery of silicosis it is optional whether a miner takes an award and quits or remains at work to accept compensation later, "provided he does not thereafter develop silicosis." During each of the three years covered by the report, the number of white persons given periodic examinations was 30,465, 32,382 and 29,817 respectively. The corresponding prevalence rates for silicosis were 15.46, 15.53 and 18.67 per thousand. The "production rates" (i. e. the number of new cases developing each year) were 7.61, 7.90 and 10.05 per thousand. In 1927-1928 the production rate was 19.41, and it had decreased to the all time low of 7.03 in 1937-1938. However, it is pointed out that these figures are misleading, particularly now when the population under consideration contains an excess of men employed for relatively short periods. The "New Rand Miners," i. e. those employed since dust control was established in 1916, now constitute 83 per cent of the group currently examined, and their production rates vary from 1.76 to 3.20. Among the white miners employed previous to 1916 the corresponding annual rates now range from 44.59 to 60.96. These figures indicate pointedly the effect of rigid selection of employees and the control of underground environment. They also emphasize the chronicity of silicosis, since so many men employed for over twenty-five years are still developing their first signs of the disease. The average duration of employment of cases first detected with silicosis in 1940-1941 was 9¾ years, as contrasted with 19 5/12 years in 1922-1923. The effect of control has been to double the time required to produce the disease. As the result of improvements in the drills, these machines now produce a great deal less dust and the special rates for drill operators have correspondingly decreased. Whereas in 1929-1932 drillers developed four times as much silicosis as nondrillers, their current rates are essentially the same as those for other underground employees.

The data on progression of silicosis are somewhat confusing because it is not clear whether all or only a part of the cases under discussion are still under exposure. However, the figures do indicate that progression is dependent on the amount of dust retained within the lungs at the time exposure ceases and the presence or absence of associated tuberculosis. In the absence of such infection cessation of exposure often results in prolonged and apparently indefinite arrest of the silicosis. This leads to the present conclusion that, regardless of economic considerations, miners should be urged to seek other occupations on first detection of evidence of silicosis.

The continued effort to eradicate tuberculosis has yielded returns and today this complication, which accounts for so much of the disability in the silicotic, develops rarely. During the three year period of the report there were only 46 new cases of tuberculosis not previously detected in this group of some 29,000 to 32,000 white miners. Ten of them made their first appearance as the combined lesion, "tuberculosis with silicosis," 7 in men continuing to work underground after notification of silicosis and 3 in persons with no previous evidence of silicotic fibrosis. The other 36 cases appeared as uncomplicated tuberculosis, although in some instances silicotic reaction was subsequently manifest after a variable period. In each of these years the annual production rates per thousand for "tuberculosis with silicosis" were 0.16, 0.12 and 0.03, and those for simple tuberculosis were 1.19, 0.65 and 0.44. The "Old Rand Miners," whose employment dates back to the days before dust control, still continue to develop five to seven times as much tuberculosis as the more carefully selected group of more recent employees.

Reexamination of beneficiaries under compensation who are no longer exposed to dust revealed that some who left the mines when notified over twenty-five years ago have experienced no progression of silicosis. Only about 27 per cent have advanced from one to successive stages of the disease in the past triennium, in three fourths of the cases without the intervention of tuberculosis.

Native laborers, who constitute the largest part of the working force, also receive frequent physical examinations. The cost has prevented general use of the x-rays and the reason is apparent when one considers the number employed in each of these three years, 315,742, 328,506 and 359,710 respectively. Besides preemployment and discharge examinations any native found to have lost 5 or 6 pounds in weight on a routine check every six weeks is given at least a physical examination, and after five years of service all are checked routinely every three months. Among this group the incidence rate for silicosis is only about 2 per thousand; for tuberculosis in all forms it now runs about 3.3 to 3.5 per thousand. The need is stressed for routine x-ray examinations of all natives to check such development. The low silicosis rate for natives is due to the fact that their periods of employment are much shorter than for white miners.

Clinical Evaluation of the Rehabilitation of the Tuberculous: Experience at Altro Work Shops 1915-1939. By Louis E. Siltzbach, M.D., Chest Physician, Committee for the Care of the Jewish Tuberculous, Inc., New York. Cloth. Pp. 70, with 10 illustrations. New York: National Tuberculosis Association, 1944.

In seventy well printed and nicely bound pages Dr. Siltzbach has presented in an admirable manner a practical demonstration of the effectiveness of rehabilitating tuberculous patients. He describes the Altro Workshop, which opened its doors in June 1915 for the employment of tuberculous patients as a part of their rehabilitation. This workshop is engaged in the manufacture of washable garments for hospitals, health organizations and commercial establishments. Just now a large part of its output consists of cotton uniforms for the Red Cross and the government services.

Applicants between the ages of 16 and 55 are eligible, without regard to sex, marital status, race, color or creed. Patients are accepted from all institutions and from public and voluntary agencies as well as from private physicians. They are admitted to begin on part time work. It is preferred that their disease be classified as arrested before work is begun. Some patients are still receiving artificial pneumothorax while they are being rehabilitated. The workshop also receives a few persons who need permanent, sheltered employment. Some of these individuals actually have tubercle bacilli in the sputum but are able to work under close medical supervision. All of the persons employed in this workshop are observed with extreme care and at frequent intervals by the medical staff, and the work they do as well as the number of hours per day is prescribed by physicians.

Usually patients are not discharged until they are able to work on a full time basis. After discharge, a close follow-up is made to be sure that their lesions remain well under control. This is for the remainder of their lives. Of course those with tubercle bacilli in the sputum are never discharged to be employed in outside organizations.

Between 1915 and 1939, 964 patients were admitted to this workshop and were followed to the closing date of the survey, July 1941. Ninety-seven per cent of the workers were traced five years and 92 per cent ten years. Four out of five of the workers had moderately or far advanced lesions on entrance to the workshop; in 63 per cent the lesions were arrested. At the end of ten years after discharge, 87 per cent of the workers with minimal lesions and 86 per cent of those with moderately advanced lesions survived. Of those with far advanced lesions only 63 per cent survived. Seventy-two per cent were able to work full time on the fifth anniversary of their discharge, on the tenth anniversary 62 per cent. Five hundred and fifty-two of the workers completed the course and were graduated as apparently fully rehabilitated, 89 per cent of whom were working or were able to work on a full time basis on the fifth anniversary and 85 per cent on the tenth anniversary from discharge. This is a splendid accomplishment and should lead the way to the establishment of many more similar institutions.

The Embryology of Behavior: The Beginnings of the Human Mind. By Arnold Gesell, M.D., Ph.D., Sc.D. In collaboration with Catherine S. Amatruda, M.D. Cloth. Price, $5. Pp. 289, with illustrations. New York & London: Harper & Brothers, 1945.

This book is a description of the body and mind "in the making." The author's assumption is that, as the soma takes shape, the psyche takes shape: "we are dealing with a single developmental morphology." In the first nine chapters the beginnings of behavior are traced. Here an enormous literature is digested and organized into a fascinating account of the development of the embryo and of the structure and behavior of the fetus. The primitive motor system, breathing, behavior and muscle tone are discussed. The concept of electrotonic integration and the interdependence of structure and function are elaborated skilfully. Two chapters are devoted to observations of the behavior of prematurely born infants. The subjects were infants cared for in the station for prematurely born infants at the New York world's fair. Here the methods of observing and recording infant behavior already made familiar in the author's previously published works were utilized to give a vivid and exact description of the behavior patterns of these youngest infants. A chapter on the cycle of sleep gives in great detail observations on the development of the normal diurnal sleep cycle. In the first chapter the universality of the laws of physical and biologic science that underlie the possibility, of "bringing into unitary progressive relationship both living and nonliving systems" is discussed. Numerous photographs delineate the behavior patterns of prematurely born infants. This carefully written book condenses for physicians and students of behavior much of present day knowledge of the beginnings of behavior. The new work of the author pertaining to the prematurely born is of a high order of importance. The concept of behavior as an aspect of the functioning of a total organism, understandable in terms of its immaturity or maturity, is a valuable one for medical students to grasp adequately. While the publishers would like us to believe that this book is one that could be read by prospective parents, it is much more suitable for the medical student, pediatrician and students of behavior than for lay readers. It is certainly one of the best of the many excellent publications by Dr. Gesell.

Atlas of Dental and Oral Pathology. By James B. Mann, Colonel Dental Corps, U. S. Army; J. E. Ash, Colonel Medical Corps, U. S. Army, and Joseph L. Bernier, Major Dental Corps, U. S. Army. Prepared at the Army Institute of Pathology of the Army Medical Museum, Office of the Surgeon General, Washington, D. C. From Material in the Registry of Dental and Oral Pathology. Third edition revised by Henry M. Goldman, Lieutenant, Dental Corps, U. S. Army. Cloth. Price, $5. Pp. 310, with illustrations. Chicago: American Dental Association, 1944.

The revised edition of this well known atlas gives a complete illustration of dental and oral pathologic conditions. Although attention is focused on the histopathology, photos of patients and roentgenograms are added wherever they are necessary for the understanding of the condition. The photomicrographs are, with a few exceptions, good and clear. In some instances the general view pictures under low power are not entirely satisfactory. Some of the diagrams used are too primitive. The text accompanying the illustrations is excellent in its brevity and clarity. Every dentist and oral surgeon will study this atlas to great advantage and will want to have it in his library. The physician will find it to be a useful reference book.

A Source-Book of Biological Names and Terms. By Edmund C. Jaeger. Cloth. Price, $3.50. Pp. 256, with 96 illustrations by Merle Gish and the Author. Springfield, Illinois & Baltimore: Charles C Thomas, 1944.

This work includes 12,000 elements from which scientific biologic names and terms are made. With them are the Greek, Latin or other origins and some concise definitions. The book should be most useful to students of biology.

Old Age: Some Practical Points in Geriatrics. By Trevor H. Howell, M.R.C.P., Captain, R. A. M. C. Boards. Price, 4s. 6d. Pp. 50. London: H. K. Lewis & Co., Ltd., 1944.

This work represents a collection of reprints from a number of British medical periodicals. It is exactly what the title purports it to be—a collection of clinical points by an experienced practitioner.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

HEALTH FACILITIES AND LIABILITIES IN SUMMER CAMPS

To the Editor:—I am a member of a board regulating activities at a summer camp for children. We are about to erect an infirmary, and in that connection I am debating the wisdom of confining sick children there or sending them home, particularly those who have acute upper respiratory infections who might be ill for two or three days or, as occasionally happens, might develop complications. What legal difficulties might develop if a sick child is cared for in the infirmary and something unforeseen should occur? Would this legal liability apply equally to the scholarship camper (nonpaying) and the paying camper? I should like to know how other camps caring for about 100 to 150 campers weekly have approached this problem. Any information you can give me would be appreciated. M.D., Ohio.

ANSWER.—The question is in two parts, medical and legal. Each is answered separately.

1. Summer camps, except those specifically established for the care of sick or handicapped children, should be places where well children can enjoy a full measure of activity. They are not places for prolonged care of ill children. The camp infirmary, except in rare instances, is not usually a suitable place to care for sick children beyond a short time. A camp should have at least a dispensary and a few beds for emergencies; more important, and usually neglected, is that competent personnel shall be available for the use of facilities. The erection of an infirmary is only a beginning in the solution of the problem here posed. Provision must be made for resident medical care or availability from nearby with genuine ease and promptness, plus nursing care if required.

Children mildly ill for a day or two may often return to full participation in camp life and can safely be observed in an infirmary, but if illness is severe or prolonged the child should be removed to home or to a nearby hospital. Authorization for such action may be obtained from parents in advance or as the occasion arises and should include clear statement as to responsibility for expense incurred. Communicable diseases are usually at a minimum in the summer; nevertheless the possibility of their occurrence should be considered. The infirmary will be less likely to prove a center of contagion if it is built so that one or at most two persons occupy a cubicle. Construction of such an infirmary need not be elaborate, but it should be a building finished with plaster and paint and glass windows; rough open construction is difficult to keep clean.

2. The courts, as far as the reported court decisions indicate, have never been called on to pass on legal liability in this particular connection. In the absence of any specific agreement between camp authorities regarding the medical care or attention to be provided for a particular child, on general legal principles there would seem to be no basis for imposing a different degree of care on the part of the camp with respect to a "paying" camper and a "nonpaying" or "scholarship" camper, and the law would seem to impose the same degree of care and solicitude on camp authorities with respect to each type of camper. An answer concerning the legal liability that might develop "if a sick child is cared for in the infirmary and something unforeseen should occur" must be extremely general. As far as is here material, the foundation of legal liability rests either on negligence or on the breach of a promise to do a particular thing. In the absence, then, of a specific undertaking to do certain things, liability must rest on negligence—that is, on a failure to do what an ordinarily reasonable man would do under similar circumstances. Neither the camp nor the physician is an insurer of good results. It is not responsible for bad results—presumably the "something unforeseen" referred to in the question—unless that bad result is causally related to a responsible negligence. Whether or not the camp was negligent is a question of fact to be determined in the light of the evidence in each case.

PRESERVATION OF BREAST MILK

To the Editor:—What is the accepted method of preserving breast milk in small quantities for hospital use? H. A. Raube, M.D., Beloit, Wis.

ANSWER.—Breast milk can be kept as long as a year by freezing. For small quantities, pasteurize the milk and strain through sterile gauze into a sterile 4 ounce nursing bottle; cap immediately. When cold, place in the freezing chamber of an ordinary electric refrigerator. About ten hours is required to freeze the milk solid when the gage is set to freeze ice cubes. Bottles holding more than 4 ounces will break during freezing. The frozen milk may be kept in the coils or the freezing chamber of the ice box; however, a "deep freeze" storage chamber is preferable if one can be obtained. The milk should be repasteurized before using, and a check of the condition of the supply should be occasionally made by culturing a sample for the presence of bacteria. Milk that has thawed for any length of time should not be used.

Reference:

Watson, Mary L.: Our Frozen Milk Bank, *Am. J. Nursing* **41**: 673 (June) 1941.

PATCH TESTS FOR OCCUPATIONAL DERMATOSES

To the Editor:—What is the diagnostic importance of the skin patch test in occupational contact dermatoses? What is the relationship of the patch test to the history and to the clinical and laboratory examination in cases of occupational dermatoses? M.D., Pennsylvania.

ANSWER.—The patch test is an important and valuable criterion in the diagnosis of allergic occupational dermatitis. In industry it is a comparatively easy matter to learn all of the allergenic substances which come in contact with the worker in his occupational environment. Therefore, obtaining these substances and performing patch tests with them is not difficult.

The patch test should be employed only by physicians familiar with the technic of its application and experienced in reading and evaluating the reactions.

Patch tests should not be performed with primary skin irritants, i. e. those which will inflame all skins. If it is necessary to ascertain whether a worker is hypersensitive to the action of primary skin irritants, patch tests can be performed with such dilutions of the chemical as will not affect the normal skin. Such dilutions have been ascertained for many chemicals (Schwartz, Louis, and Tulipan, Louis: A Textbook of Occupational Diseases of the Skin, Philadelphia, Lea & Febiger, 1939, pp. 53-61).

The patch test is not the sole criterion on which the diagnosis of occupational dermatitis is made, other criteria being the occupational history, the site of the eruption, its appearance and differential diagnostic data. The subject of patch testing is broad. For further discussions the following references are suggested:

U. S. Public Health Bulletins "Occupational and Related Dermatoses, Abstracts of the Literature," No. 266, pp. 35-39, and No. 284, pp. 114-117.

Schwartz, Louis, and Peck, Samuel M.: The Patch Test in Contact Dermatitis, *Pub. Health Rep.* **59**: 546 (April 28) 1944, Reprint No. 2552.

ENCEPHALOGRAM IN DIAGNOSIS OF IMBECILITY OR ENCEPHALITIS

To the Editor:—A boy now 6 years of age has a mental age of about 18 months. He had an apparently normal first year according to the parents and the family doctor; he walked well at 15 months. Snapshots taken during his first year certainly tend to confirm the impression of normality, his expression being bright and alert, in striking contrast to that at present. Sometime in his second year mental development stopped. Skeletal x-rays show normal ossification. During his second winter he had repeated severe upper respiratory infections, in the course of one of which he was extremely drowsy for an entire week. If he had had some form of encephalitis at that time would an encephalogram made now establish such a diagnosis? The parents are expecting a second child, and any light on the situation might serve to relieve their anxiety. They have been told at the institution where the child is an inmate that an encephalogram would be a foolish waste of time and money.

Elizabeth Roylance Daley, M.D., Bronxville, N. Y.

ANSWER.—An encephalogram would not furnish information which would alter the therapy or improve the prognosis in this case; from this aspect it would be a waste of time and money. However, it probably would furnish evidence of any gross atrophy of the brain. Such pathologic changes, if present, would presumably be acquired and not genetic in origin—a matter of moment to the parents. The examination would not disclose the agent responsible for such pathologic changes; the history is suggestive of encephalitis. An electroencephalogram might give additional information of localized acquired pathologic changes.

THIAMINE HYDROCHLORIDE FOR PAINS IN ARMS DURING PREGNANCY

To the Editor:—In the February 17 issue of The Journal there was an inquiry by O. G. Mills of Oshawa, Ont., regarding pains in the arms during late pregnancy. The answer stated that the administration of vitamins and calcium is of no value. I wish to disagree because I have found in many cases that the use of 10 to 30 mg. of thiamine hydrochloride taken orally stopped the pains and the numbness frequently both in the arms and in the legs.

Edward Lyman Cornell, M.D., Chicago.